

April 3, 2023

Peter Hays Division of Reclamation, Mining and Safety 1313 Sherman Street, Room 215 Denver, CO 80203

RE: Response to 2nd Adequacy Review Comments for Martin Marietta Materials, Inc., Windsor East Mine, File No. M-2022-042, 112c Permit Application

Dear Mr. Hays:

This letter is in response to your 2nd Adequacy Review Letter, dated March 22, 2023, regarding Exhibit G - Water Information for Martin Marietta Windsor East Mine's 112c Permit Application (File No. M-2022-042).

Please find below our responses to the comments made by Eric Scott in his letter dated March 17, 2023. For ease of review, we are only responding to the comments made by Eric where he had more to say than "Adequate as Submitted".

Comments

4. Section 1.6 of the provided materials describes a "simplified model" and states that it was calibrated/verified based on observed drawdown in one well. This model is then used to predict groundwater drawdowns due to mining after one year and 5 years of dewatering at distances up to 2640 feet. <u>DRMS will require a substantially more rigorous modelling demonstration to predict and illustrate the maximum groundwater drawdown impacts from dewatering during mining, potential impacts to nearby wells, as well as any post-mining mounding and shadowing impacts due to the construction of impermeable or low permeability mine cells. The model should provide GW drawdown/mounding contour maps based on, and verified against all available site setting and geologic information, current and historic water level data, and the predicted size and location of mining cells (for both sites).</u>

Additional modeling was not provided, however, the rationale for not providing a modeling evaluation based on: existing monitoring and drawdown data, distance and direction to nearest non-monitoring wells, and nearest well ownership and use is sound. In addition, although the likelihood of impacts to off-site wells is minimal, the monitoring and mitigation plans provided should be able to sufficiently address any unforeseen impacts if any are observed.

<u>Response</u> Acknowledged

- 5. Section 2.1 of the provided exhibit states that up to 5 quarters of "baseline" GW level data will be collected for the WEM site with the exception of Cell A where dewatering will commence immediately. This is based on the rationale that GW levels in that area have already been impacted by the adjacent Parsons dewatering activity. DRMS acknowledges that the historic GW regime has likely already been impacted to some extent by the adjacent Parsons site. However, based on the observations of significant GW drawdowns at distance from the Parsons site, allowing dewatering of Cell A while attempting to collect "baseline" water level data for the remainder of the WEM site will likely render that data useless as a "baseline" for later mining drawdown comparison. Dewatering or exposure of GW should not be allowed on the WEM site until the full 5 quarters of baseline data can be collected.
 - a. Mining below groundwater/dewatering of Cell A during collection of the 5 quarters of baseline data may also adversely impact the validity of the baseline analytical data results.

Not addressed, however, rationale provided for the proposed activity based on existing data and continued monitoring is sound.

<u>Response</u> Acknowledged

- 6. Water Quality Parameters and rationale presented in section 2.2.1 and Table 5 are acceptable as presented with the following edits.
 - a. Add CN to section 2.2.1 or sample for it.
 - b. WQS for U should be 0.0168 to 0.03, not 0.02 as stated in Table 5
 - c. Will any QA/QC samples be collected/run to verify field and lab procedures?
 - d. I note that although there are several wells on the adjacent Parsons site, no analytical data has been presented as "background" for WEM, however, that may be a subject for another discussion.

Adequate as submitted - with the exception of item "c." No response was provided to address the question if any QA/QC samples would be collected/run to verify field and lab procedures as a component of the provided analytical monitoring plan. If no QA/QC samples are collected the applicant will need to acknowledge that the only way to address potential "outlier" data, if observed, will be through re-sampling and re-analysis.

<u>Response</u>

Martin Marietta will collect a duplicate sample as part of each sample-collection round to improve QA/QC for the program. Exhibit G has been revised to reflect this.

10. Section 2.3 also states that "if a well goes dry, MM will implement mitigation measures within 7 days." In the event that a well owner reports that their well has become unusable, MM will be required to implement mitigation measures immediately (as soon as practically possible). MM will concurrently commence an investigation into the status of the complaint. The results of this investigation as well as any proposed remediation or rationale for discontinuing mitigation will be submitted to DRMS for approval within 30 days.

Partly addressed. The language in comment #9 above has been incorporated. The initial investigation, as well as the temporary, and long-term impact mitigation measures proposed are reasonable and appropriate. However, the operator should acknowledge that the DRMS, and potentially the MLRB, are responsible for determining if mitigation is required, as well as when and how any mitigation measures are implemented and discontinued after the initial complaint is received.

<u>Response</u>

Exhibit G language in section 2.3 has been revised to explicitly recognize that the DRMS and/or MLRB are responsible for determining if mitigation is required and when and how mitigation measures will be implemented following receipt of a complaint.

11. Appendix G-3: Because the analyte list and reporting levels have been identified, please identify and include the sample container type and size, preservative (if required), holding times, and analytical method to be used. This information could also be included in Table 5.

Adequate as submitted - Analytical methods have not been provided, but it has been noted on Table 5 that the method selected must provide reporting levels below the applicable standards.

<u>Response</u> Acknowledged. Thank you for your consideration. If you have any questions or need additional information, please let me know.

Sincerely,

TETRA TECH

Chris Getmann

Christopher Gutmann, P.G. (Arizona) Hydrogeologist

cc: Julie Mikulas, Martin Marietta Pam Hora, Tetra Tech

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EXHIBIT G: WATER INFORMATION

1.0 INTRODUCTION AND BACKGROUND

This Exhibit addresses the hydrologic conditions at the Windsor East Mine located in Section 36, Township 6 North, Range 67 West of the 6th Principal Meridian, Town of Windsor, Colorado (See Figure G-1), The Exhibit documents the depth and direction of groundwater flow, the nature of the subsurface geologic materials through which it flows (Figure G-2), any interactions with streams, lakes, canals or other surface water bodies in the area and the potential impacts to surrounding water users due to mining impacts.

The information in this Section is intended to satisfy the requirements outlined in Sections 3.1.6, 6.3.3, 6.3.4, and 6.4.7 of the Colorado Mined Land Reclamation Board's Construction Material Rules and Regulations.

Section 3.1.6

(1) Hydrology and Water Quality: Disturbances to the prevailing hydrologic balance of the affected land and of the surrounding area and to the quantity or quality of water in surface and groundwater systems both during and after the mining operation and during reclamation shall be minimized by measures, including, but not limited to:

(a) compliance with applicable Colorado water laws and regulations governing injury to existing water rights;

(b) compliance with applicable federal and Colorado water quality laws and regulations, including statewide water quality standards and site-specific classifications and standards adopted by the Water Quality Control Commission;

(c) compliance with applicable federal and Colorado dredge and fill requirements; and

(d) removing temporary or large siltation structures from drainage ways after disturbed areas are revegetated and stabilized, if required by the Reclamation Plan.

Section 6.4.7

(1) If the operation is not expected to directly affect surface or groundwater systems, a statement of that expectation shall be submitted.

This site is directly adjacent to the Cache la Poudre River. The Cache la Poudre River will be utilized for the discharge of dewatering water from each of the proposed mine cells. The presence of the river has the collateral benefit of mitigating groundwater drawdowns and associated impacts to wells east of the Site.

(2) If the operation is expected to directly affect surface or groundwater systems, the Operator/Applicant shall:

(a) Locate on the map (in Exhibit C) tributary water courses, wells, springs, stock water ponds, reservoirs, and ditches on the affected land and on adjacent lands where such structures may be affected by the proposed mining operations.

Please see Exhibit C Pre-Mining Maps for the location of all tributary water courses, wells, springs, stock water ponds, reservoirs, and ditches on the affected land and on adjacent lands where such structures may be affected by the proposed mining operations.

(b) Identify all known aquifers

The Windsor East site is underlain by two aquifers:

- The valley-fill deposits of the Lower Cache la Poudre River.
 - described in: Hershey, L.A. and PA. Schneider, 1972. "Geologic Map of the Lower Cache la Poudre River Basin, North-Central Colorado", USGS Miscellaneous Geologic Investigations Map I-687. (See Figure G-2)
- The Fox Hills Sandstone
 - described in: Robson, S.G. 1989, "Alluvial and Bedrock Aquifers of the Denver basin Eastern Colorado's Dual Ground-Water Resource", USGS Water-Supply Paper 2302

(c) Submit a brief statement or plan showing how water from de-watering operations or from runoff from disturbed areas, piled material and operating surfaces will be managed to protect against pollution of either surface or groundwater (and, where applicable, control pollution in a manner that is consistent with water quality discharge permits), both during and after the operation.

The geologic conceptual model of the subsurface and groundwater was developed from the geologic map for the area and the boring logs associated with the installation of the monitoring well network at the Windsor East site and the Parsons Mine site located to the east (Figure G-3). Based on water levels measured in these wells, a groundwater level elevation map was developed (Figure G-5). Following removal and stockpiling of topsoil, each of the four cells will be dewatered and mined. Sand and gravel will be extracted using the "dry" mining method in which the water table is lowered to allow mining to be performed under drained conditions. To lower the water table, local dewatering is conducted using a perimeter drain constructed around each planned mining cell.

The dewatering system would discharge to the Cache la Poudre River. Dewatering of the mine would lower the groundwater levels to a limited extent in the surrounding alluvial aquifer and will not impact the underlying Fox Hills Sandstone aquifer. Effects on groundwater levels are projected to be limited in extent due to natural and manmade hydrologic and hydrogeologic characteristics and boundaries, principally including the transmissive nature of the alluvial aquifer, the Cache la Poudre River, and the mining operation. Figure G-6 illustrates the resulting changes to groundwater flow directions during mining and after reclamation.

The available gravel resource is anticipated to be mined for approximately 6 years; however, the rate of mining and overall life of the mine is dependent upon demand and market conditions. All material mined at Windsor East will be conveyed to Martin Marietta's adjacent Parsons Mine site for processing at the existing plant on that site.

Upon completion of mining, the reclamation plan for the mine includes the placement of compacted clay embankment liners in Mining cells A and C, while cells B and D will be backfilled with non-economic grade alluvium including topsoil, sands, and fine gravel. These cells will thereby be converted to sealed water storage reservoirs, which will be owned and used by GWIP, LLC, the landowner of the Windsor East Mine site.

Exhibit D: Pre-Mining and Mining Plan shows the location of the Affected Area and proposed mining cells. Changes to the hydrologic balance within the Affected Area will be limited to the localized dewatering associated with the excavation of the mine cells, and the minor alteration of the existing groundwater flow patterns due to the subsequent installation of compacted clay embankment liners during reclamation. Figures G-5 and G-6 show the mine cells and conceptual groundwater flows before and after the installation of the compacted clay liners.

1.1 HISTORIC USE

The Windsor East property has historically been used for agriculture. The adjacent neighbors include Martin Marietta's Parsons Mine site to the east, agricultural land with a few residences to the north and west, and the Cache la Poudre River to the south.

Based on well registration, land use besides agriculture within two miles of the site has included Eastman Kodak to the west and northwest, Front Range Energy to the northwest of the site, Joseph Energy to the northwest of the site, and Hensel Phelps Construction to the northwest of the site.

1.2 HYDROGEOLOGIC SETTING

1.2.1 Geology

The geology mapped at land surface beneath the site consists of quaternary age valley-fill deposits comprised of sand, silt, and gravel primarily (Figure G-2). The areas of higher elevation around the site are typically comprised of quaternary terrace deposits. Boring logs from installation of monitoring wells immediately east of the property were reviewed for details on the site geology. The Parsons sand and gravel mine has 12 monitoring wells on the property, including MW-12 which is the nearest to the Windsor East property, located between the Parsons property and the Windsor East property (Figure G-3). The boring logs generally indicate that the geology consists of a 10-30 ft thick layer of unconsolidated alluvial sediments overlying siltstone bedrock. The upper 4-14 feet of the alluvial sediments are typically finer-grained silts and clays and may be only partially saturated in many locations. The lower 4-20 feet of the alluvium consists of sands and gravels which are expected to be highly transmissive of shallow groundwater.

The shallow bedrock of the Fox Hills Sandstone consists of weathered, consolidated sedimentary rock varying from claystone to siltstone as observed in the boreholes advanced on the Parsons mine property to the east. In comparison to the alluvium, the weathered bedrock is expected to be several orders of magnitude less transmissive due to the consolidated, finer-grained properties. Bedrock was encountered in the boreholes advanced at the Windsor East mine property between 15 and 22 ft below ground surface (bgs), and 13ft bgs in the nearest Parsons Mine borehole (Parson MW-12).

1.2.2 Groundwater

Groundwater at the site represents a combination of water that flows through the high-permeability valley-fill alluvial deposits parallel to the Cache la Poudre River and water that infiltrates in the surrounding higher-elevation recharge areas to the north and south of the river, typically associated with the agricultural fields that dominate the land use of the area. Infiltrating water in these areas of higher elevation drains at the lower-lying erosional valleys formed by streams and rivers of the area, resulting in flow patterns that resemble a muted form of the land surface topography. The erosional valleys are typically underlain by the higher-permeability sands and gravels deposited by historic flood events and form channeled zones through which groundwater can flow more rapidly. South of the Windsor East property, the Cache la Poudre River is the surface-water feature for local groundwater discharge. Within several hundred feet of the river, groundwater flows in a direction that is near parallel to the river due to the constant interaction with the river stage within the porous sands and gravels. As a result, while groundwater beneath the site is typically slightly higher than that of the river and flows toward the river, the flow direction of groundwater flow is generally parallel to the Cache la Poudre River from west to east, at close proximity (Figure G-5). Some minor component of upward groundwater flow from the deeper bedrock may occur, but this is likely to be negligible compared to the influence of the river and the underflow within the valley-fill alluvium.

The direction of regional shallow groundwater flow is therefore toward the southeast but changing to a near easterly direction near the river. Based on water-level measurements in the monitoring wells installed at the Windsor East mine property, the water table is approximately 8-11 feet below land surface.

1.3 EXISTING AND PLANNED WELLS

1.3.1 Existing Monitoring Wells

A network of monitoring wells was installed in 2010 to characterize the groundwater conditions at the Parsons mine east of the Windsor East property (Figure G-3). The boreholes for the wells were drilled to the bedrock contact and the wells were constructed using 8-10 foot screened intervals between the water table and the bedrock contact. These wells generally show the direction of groundwater flow in an easterly direction, in equilibrium with the river water elevations, although subject to the influence of the Parsons mine cell dewatering.

1.3.2 Well Inventory

In May 2022, a well inventory of the Affected Area and adjacent areas was conducted to identify wells near the project. The inventory included a search of the State of Colorado Office of the State Engineer database of wells located within $\frac{1}{2}$ mile of the Affected Area (Table 1). The well inventory identified 25 constructed wells within $\frac{1}{2}$ mile of the Affected Area. Figure G-4 enclosed shows the Affected Area and the constructed well locations on file with the Colorado Division of Water Resources.

Wells located within 600 feet of the Lease Boundary

The well inventory identified two wells completed in the alluvial aquifer within 600 feet of the lease-area boundary. The first is a monitoring well (Parsons MW-12) owned by Martin Marietta (permit # 280593) associated with the Parsons mine immediately to the east of the Windsor East property. Bedrock was encountered at 13 ft bgs and water was observed at approximately 6-8 ft bgs. The second is a monitoring well owned by Hall-Irwin Corporation (permit # 277000). It was constructed in 2007 and was screened from 4 to 15 ft bgs. Bedrock was encountered at 13 ft bgs and water was observed at approximately 2 ft bgs in 2007. Monitoring holes and wells are not a concern for dewatering impacts because neither are allowed to serve as pumped sources of water.

Water supply wells located within 1/2 mile of the Lease Boundary

In addition to the wells identified within 600 feet of the lease boundary, the well inventory identified two residential wells, eight monitoring/observation wells, three monitoring holes, and one general purpose well completed in the alluvial aquifer within ½ mile of the lease-area boundary. Appendix G-5 provides a letter from GWIP LLC regarding the status of wells 89706-A, 113762—A, and 1472-R-R.

Permit number 89706-A

Domestic/Residential well (89706-A) is registered to Brett T and Mary K Lauer. It was constructed in 1977 to a depth of 32 feet. It is located slightly more than 600 feet distance from the lease boundary on the northwest corner, and approximately 1,060 feet northwest from the nearest planned mining cell. The well is 5-inch diameter PVC, screened from 17 to 32 ft bgs, and was equipped with a pump capable of 30 gpm. The driller's log indicates that water was encountered at 12 feet bgs in 1977. A 6-hr pumping test conducted in 1977 resulted in sustained pumping of 20 gpm and a pumping water level of 27 ft bgs (15 feet of drawdown, a specific capacity of 1.33 gpm/ft). Bedrock was observed at 27 ft bgs. The parcel that this well sits on is owned by GWIP LLC, the property owner for this reclamation permit application.

Permit number 113762--A

Domestic well (113762--A) is registered to M WaterCo LLC, although originally to Harold Long and Sons. It was constructed in 1980 to a depth of 25 feet. Water was noted at 12 ft bgs and bedrock was encountered at 20 ft bgs. A sustained pumping test of 30 gpm for 2 hours was conducted in 1980 with no recorded drawdown. It is located 1500 to 2000 feet distance from the lease boundary on the north side. A registered domestic well with a similar permit number (113762-) is associated with Harold Long and Sons Inc. The date of construction was not recorded, but the well inventory indicates that it was drilled to a depth of 30 feet, encountering bedrock at 20 ft bgs. This well shares nearly identical location and construction information (and permit number) with the well registered to M WaterCo LLC and seems to be the same well. The parcel that this well sits on is owned by GWIP LLC, the property owner for this reclamation permit application.

Permit number 1472-R-R

General Purpose well (1472-R-R) is registered to West Weld Ag Investors. This well was originally drilled for Allen Lamb with permit number 1472 before 1957 and listed as an irrigation well. It was replaced by well 1472-R at an unknown date to a depth of 15 ft bgs, with a 40 ft by 60 ft sump from which water was pumped at approximately 500 gpm. A permit application was received in 1981 to replace well 1472-R with a new irrigation well by West Weld Ag Investors with a proposed maximum pumping rate of 500 gpm and a planned depth of 50 ft. The registered UTM coordinates for the well indicate that it is located several hundred feet south of the Cache la Poudre river, but the description in the permit indicates that it is located 3,300 ft south of the northern edge of section 35 and 1,300 ft west of the eastern edge of section 35, and therefore may actually be located just north of the river near UTM 512260 E, 4476810 N. This location is approximately 1,200-1,300 ft west of the southwestern corner of the lease boundary, and approximately 1,500 ft from the nearest planned mining cell. A loop of the Cache la Poudre River extends between the lease area and the likely location for the well. Based on both a field and records investigation, the well listed at 1472-R-R is believed to have been located near the irrigation center pivot, and abandoned at some time in the past. The parcel that this well sits on is owned by GWIP LLC, the property owner for this reclamation permit application.

Monitoring Wells on the Adjacent Parsons Mine Property

Monitoring wells installed as part of the Parsons Mine operations were considered as part of this permit application. Twelve of the fourteen wells were installed in 2010 and the other two were installed more recently. Table 2 includes construction details and depth-to-water information. Measuring point elevations were surveyed on December 15, 2022, to the nearest 0.01 ft elevation. Appendix G-2 provides water levels measured over time for the Parsons Mine monitoring wells.

1.3.3 Site Monitoring Wells

Martin Marietta installed five monitoring wells (Figure G-3) in August 2022 to support the monitoring plan associated with the project, documenting the groundwater conditions before initiation of mining, during mining, and after mining is complete. Through the well monitoring program, the wells will serve as points at which water levels will be measured and water quality samples collected. The boreholes for each of the wells were advanced until bedrock was encountered. Lithologic logs documenting the valley-fill sediments observed and the bedrock during drilling were recorded. The monitoring wells were constructed of two-inch Schedule 40 PVC casing and screen. Silica sand was placed from approximately two feet above the top of the screen to the bottom of the borehole (bedrock). Above the silica sand, a bentonite seal was placed in the borehole annulus to restrict infiltration of surface water. Each of the monitoring wells was finished at the surface with a locking, aboveground, steel protective casing set in concrete. Table 3 provides additional details on the monitoring wells.

1.4 HISTORIC AND FUTURE GROUNDWATER LEVELS

Monitoring wells established at the Windsor East site in August 2022 were used to collect groundwater elevation data. This set of water level data was supplemented by water level data collected from monitoring wells on the adjacent Parsons Mine site located east of the Windsor East property. Water level data measured for the wells are included in Tables 2 and 3. Depth to water at the Windsor East site varies from 7.9 to 10.4 ft below the top of the well casing, corresponding to a range of water level elevation from 4732.14 at MW-06 to 4717.44 at MW-11. Figure G-5 presents the general direction of groundwater flow (southeast).

Since 2010, regular groundwater measurements have been collected from the 14 monitoring wells around Martin Marietta's Parsons Mine site. These wells shall hereafter be referred to as the Parsons Well Network, and are numbered MW-1 through MW-14. Appendix G-2 shows the variation in water level measurements from monitoring wells MW-1 to MW-12. Water levels measured in the Parsons well network vary from 4730 feet at MW-5 to 4690 feet above mean sea level (amsl) at MW-1 where the effects of dewatering are visible in late 2021 through 2022. Water levels are seasonally at their highest elevations in August or September following the irrigation season, and typically at their lowest elevations in February to March when irrigation has been suspended for the longest period of time. The water level at MW-12 before initiation of local dewatering in 2019 ranged from 5.8 to 7.8 ft bgs (4720.5 to 4722 ft amsl), then dropped to an average of 11.3 ft bgs (4716.7 ft amsl), a drawdown of approximately 4.6 ft. This monitoring well is located approximately 100 feet from the dewatering trench of the nearest active mining cell at the Parsons Mine, and the 4.6-foot change in water levels experienced at the Parsons Mine is expected to be representative of the drawdown that will be associated with dewatering of the mining cells at the Windsor East site.

Based on observed water levels at the Windsor East and Parsons sites, dewatering will lower water levels to within 2 feet of the top of bedrock in the immediate vicinity of each mining cell. The lowered groundwater effects

will be transmitted horizontally by the gravel aquifer, reducing water levels in the surrounding area as a "cone of depression" forms around the mining cell. During mining, water in the area will flow radially toward the dewatered cells, where it will be removed using the dewatering trench drainage system and discharged into the river.

Following mining, each cell will be lined to form a hydraulically isolated reservoir. The effect of the clay liner on the groundwater within the aquifer will be the formation of a hydraulic mound upgradient of the cell where water levels will be several feet higher than under pre-mining conditions. Downgradient of the cell, the groundwater levels will be several feet lower due to a "shadow effect" behind the reservoir. These changes in groundwater levels due to the clay-lined cells are expected to have minimal effect on the groundwater in the surrounding area due to the proximity of the river adjacent to and downgradient of the lined cells. Downgradient of the lined cells, groundwater levels will reach an equilibrium with the river due to its proximity, thereby minimizing the "shadow effect".

1.5 AVAILABLE SATURATED THICKNESS

The drilling and installation of monitoring wells at the Windsor East site in August 2022 indicated that bedrock was encountered between 15 and 22.5 feet below land surface. Water levels measured on August 12, 2022, ranged from 7.9 to 10.4 feet bgs. Based on this data, the saturated thickness of aquifer present beneath the site ranges from approximately 5 to 13.5 ft (Table 3). The lowest saturated thickness was recorded in MW-11 on the eastern side of the site, which is likely showing the direct impact of dewatering activities associated with the adjacent Parsons mine.

Dewatering activities required as part of mining in the absence of a hydraulic barrier wall result in drawdown of the water table and associated decrease in saturated thickness of the alluvium. This has the potential to impact other wells nearby if the decline in water levels is sufficient to prohibit the well owner from extracting the associated water rights from the well.

Table 4 presents historic information about the variability in saturated thickness near the site and the impact from mining based on available data. Four of the monitoring wells that were installed at the Parsons Mine Site to observe water levels at the Parsons Mine site, provide evidence of the saturated thickness of alluvium nearest to the Windsor East property. Water levels measured during pre-mining and mining conditions illustrate the expected decline in saturated thickness approximately 100 feet from the gravel mines. In particular, the Parsons Mine monitoring well MW-12 is located approximately 100 feet west of a cell that began dewatering and mining in 2019. The water level record for the well shows the range of saturated thickness for the alluvium before and during dewatering activities at this distance. MW-12 is located on the eastern edge of the Windsor East property and is therefore expected to be representative of the conditions at the site as well as of the expected impacts from dewatering during mining near the property boundary.

Before 2019, the water table was an average of 6.3 feet above the top of the bedrock at MW-12 and fluctuated over a range of approximately 1 foot above or below this average. During dewatering, the depth to water increased, and the saturated thickness decreased until it was an average of 1.7 feet above the top of the bedrock, with a variation range of approximately 1 to 1.5 feet.

Water wells completed in sand and gravel aquifers typically provide approximately 25 to 30 gallons per minute per foot of drawdown of saturated thickness in the well. Domestic wells are typically permitted for maximum pumping rates of 15 gallons per minute (gpm). As a result, less than 2 feet of saturated thickness above the pump intake is therefore likely to be required to provide the allowed pumping rates of 15 gpm. The reduction of saturated thickness of 4.6 ft at MW-12 to 1.7 ft above bedrock suggests that the potential for impact to a domestic well at this distance is likely, however, wells located further from the lease boundary will have more saturated thickness and hence will likely be able to pump the permitted rates.

1.6 HYDRAULIC IMPACTS

The hydraulic impacts associated with dewatering around the planned mine cells are expected to spread outward as a function of the aquifer properties of the alluvium, the time elapsed since dewatering began, and the distance of observation from the point of dewatering. The previous observations of the depressed water table (drawdown)

due to mining at the adjacent Parsons mine (noted in the previous section) are useful for predicting the impact of the Windsor East mine. In particular, the observations at Parsons well MW-12 (located directly between a dewatered cell and the Windsor East site) represent an ideal location from which the effects of dewatering in the vicinity can be observed. As noted in Table 4, the result of dewatering at MW-12, located approximately 100 ft from the nearest cell, resulted in drawdown of 4.6 ft. This response occurred over two years, since dewatering was variable depending on mining rates.

A water resources investigation (WRI) study performed by the United States Geological Survey (USGS) (Langer and Paschke, WRI 02-4267, 2002), explored the simulated spread of hydraulic impacts in a hypothetical situation involving the excavation of surface alluvium to bedrock (similar to most of the sand and gravel mine operations along the Front Range river corridors). Appendix G-4 shares this USGS WRI report. The study used analytical and numerical modeling of a pit near a river in a highly permeable unconfined aquifer. This study illustrated that in a hypothetical sand and gravel pit in an aquifer adjacent to a river, a numerical simulation of steady-state drawdown does not result in drawdown exceeding approximately 1 foot at a roughly 0.5-mile distance from the hypothetical pit.

There are no registered wells owned by parties other than Great Western or Martin Marietta within 0.5 miles of the Windsor East Mine property. As a result, there are no parties that are expected to be impacted as a result of either dewatering operations or subsequent development of lined ponds at the Windsor East Mine site. Therefore, detailed localized numerical modeling of hydraulic impacts has not been conducted. Additionally, there are likely mitigating factors to drawdown spread caused by dewatering. Active dewatering may stop and start at a location depending on the mining progress, the proximity of the Cache la Poudre River will provide a constant source of water mitigating drawdown impacts, and the aquifer may prove more or less transmissive depending on the location. With this understanding, the modeled spread of the hydraulic effects of dewatering suggests that the impact of the lowering of the water table during mining is unlikely to substantially affect any nearby water wells.

1.7 WATER USE

Section 6.4.7 of the Colorado Mined Land Reclamation Board's Construction Material Rules and Regulations:

- (3) The Operator/Applicant shall provide an estimate of the project water requirements including flow rates and annual volumes for the development, mining and reclamation phases of the project.
- (4) The Operator/Applicant shall indicate the projected amount from each of the sources of water to supply the project water requirements for the mining operation and reclamation.

Water use will be at its highest during the mining phase of the project. Mining at the site will intercept groundwater tributary to the Cache la Poudre River. Consumptive uses of groundwater at the site include evaporation from groundwater exposed to the atmosphere, water retained in material hauled off-site for processing, and water used for dust control.

Evaporative losses at the site are attributable to exposed groundwater in the dewatering trenches for each mine cell. Evaporative losses were calculated as the difference between gross evaporation and effective precipitation. The NOAA Technical Report NWS 33, Evaporation Atlas for the Contiguous 48 United States (U.S. Department of Commerce) was used to determine the site's average annual gross evaporation of 43 inches. Precipitation was obtained from the Western Regional Climate Center for the Fort Collins weather station (053005). The gross annual precipitation for this site was determined to be 15.08 inches. Effective precipitation was calculated as 70 percent of gross precipitation; thus, the average annual effective precipitation was determined to be 10.56 inches. The resulting evaporative loss rate is therefore 27.92 inches. The maximum total annual evaporative consumptive use at the site is estimated at 12-17 acre-feet, which is primarily a function of the water used for dust control (10-15 ac-ft/yr).

2.0 MONITORING AND MITIGATION PLAN

This Groundwater Monitoring and Mitigation Plan is prepared as part of Martin Marietta's application to the Colorado Division of Reclamation, Mining and Safety (DRMS) for a permit for the Windsor East Mine in Weld County, Colorado. This plan presents the methods and locations for monitoring of groundwater during gravel mining and site reclamation activities. Although adverse impacts to other local users of groundwater are not expected due to activities at the mine, this plan addresses how any adverse effects to groundwater would be mitigated, should they occur.

Martin Marietta will submit a Temporary Substitute Water Supply Plan to the State Engineer's Office for approval. The temporary substitute supply plan is designed to protect senior vested water rights and mitigate potential depletions of flows in adjacent waterways.

2.1 MINING PLAN

Except for Cell A, the mining plan has been designed to allow for up to five quarters worth of groundwater monitoring to occur before excavation below the water table occurs. This monitoring includes monthly water level measurements in the five monitoring wells at the Windsor East Mine site, and five quarterly water-quality sample collection events. To allow for sufficient time for groundwater characterization to occur, mining is only planned to occur in the unsaturated zone until one year's worth of monitoring and groundwater sample collection has been conducted. An exception will be made for mine Cell A. This cell is the easternmost cell in the mining plan and is located within several hundred feet of the Parsons mine. As a result, water levels are already lowered in the area from Parsons dewatering. Since changes to the groundwater flow regime have already been substantially implemented, trenching and mining below the water table at Cell A with associated dewatering will begin before the five quarters of monitoring has taken place. Following the five quarters of monitoring, dewatering trenches will be excavated around the perimeter of each remaining mine cell on a schedule determined by the mining plan.

Dewatering will occur initially adjacent to the area on the east where dewatering associated with Parsons mine has already reduced water levels (Cell A). The bottom of the trench will be maintained at or deeper than the deepest point in the excavated mine cell, thereby intercepting all groundwater before it reaches the mine cell. After collection of five quarters of groundwater monitoring, mining will gradually progress westward, with perimeter dewatering drains preceding excavation below the water table. Groundwater flow into each dewatering trench will be accumulated in connected sumps and discharged directly into the Cache la Poudre River.

Following completion of mining activities, mine cells A and C will be finished with a compacted embankment liner from material located on-site, keyed into the bedrock at the base of the mine cell, thus forming a low-permeability bathtub in the mine cell. Once finished, dewatering of the perimeter trench will cease, and the trench will be backfilled, allowing groundwater to return to a state of natural flow around the now-lined mine cell. It is expected that some minor hydraulic mounding may occur upgradient of the lined mine cell, with some "shadow effect" (decline in groundwater level) downgradient of the mine cell. Since no existing water wells have been identified downgradient between the mine and the river, the shadow effect is not anticipated to impact other users. Figure G-6 depicts the anticipated groundwater flow directions resulting from the installation of the compacted liners during reclamation.

Mine cells B and D will be backfilled with non-economic aggregate. While this material is expected to be finergrained than the existing subsurface sands and gravels being mined, they are not expected to represent a significant barrier to flow. Some minor hydraulic mounding may occur to the northwest of each of the cells, but the effect is presumed to be localized and limited to less than 2 feet relative to the surrounding water table.

2.2 MONITORING

The monitoring plan will consist of regular data collection from the set of five monitoring wells installed around the perimeter of the Windsor East property (Figure G-3). Data collection activities will include monthly measurement of water levels in wells and quarterly sampling of water quality from wells and surface discharge locations for a minimum of five quarters. Following five quarters of background water quality sample collection and analysis, Martin Marietta will submit a summary of the water quality results to DRMS for review, and a formal request to reduce the analyte list and/or frequency for water quality sample collection, if appropriate.

2.2.1 Water Quality Parameters

Martin Marietta will collect water samples from each of the wells and discharge outflow sites and submit the samples to an analytical laboratory to determine water quality for a set of parameters. As part of this process, notes will be recorded on field forms or in a logbook documenting the activities related to sample collection including date, time, measured water level, pre-sampling well purging details, and sample collection documentation. The DRMS recommends a set of parameters for analysis for aggregate mine permitting. These include a list of dissolved metals, radiological parameters, and miscellaneous parameters which include pH and total dissolved solids (TDS). The nature of activities associated with sand and gravel mining involves excavation of large volumes of aggregate materials using industrial machinery. These activities inherently do not result in the generation or release of coliform bacteria, asbestos, chlorophenol, foaming agents, odor, or phenol compounds. They also do not result in a change in corrosivity of water, or color change. As a result, these parameters which are otherwise a part of the DRMS requirements for water quality analysis are excluded from the list of water quality parameters. Likewise, sand and gravel mining does not lead to the generation or release of gross alpha or beta and photon emitters as part of the operation. Martin Marietta acknowledges the preference on the part of DRMS to have gross alpha radiological analysis performed and will include it in the list, but will exclude beta and photon emitters from analysis. Table 5 presents the complete list of water quality parameters proposed for analysis.

Quality Assurance / Quality Control (QA/QC) samples will be collected as part of the monitoring program. Typical sampling programs may employ a range of samples for the purposes to confirm laboratory procedures, field conditions, sampling methodologies and consistency of data including trip blanks, field blanks, field duplicates. Trip blanks consist of a laboratory pre-filled volatile organic analysis (VOA) 40 mL bottle which is transported in the same coolers with the samples between the water source and the laboratory to determine whether volatile organic compounds (VOCs) are a product of the sample containment and transportation process. Field blanks are sample bottles filled using deionized or distilled water previously obtained from a laboratory and filled on site to evaluate whether the process of sample collection is a source of dissolved constituents, and are typically analyzed primarily for VOCs. Field duplicates represent a paired sample collected at the same time as the primary sample, using the same sized bottles and run for a similar set of analysis to determine whether variation due to sample collection and laboratory analysis procedures result in a significant range in analytical results. Martin Marietta will collect one field duplicate per sampling event for QA/QC purposes, but since VOCs are not a part of the sampling program, trip blanks and field blanks will not be collected.

2.2.2 Windsor East Monitoring Wells

The monitoring plan will consist of regular data collection from the five monitoring wells installed around the perimeter of Windsor East (Figure G-3). Monitoring data will be used to identify potential changes in alluvial groundwater flow or elevation associated with mining and reclamation activities. Baseline data collected from the monitoring program will provide a range of relative water levels associated with pre-mining groundwater conditions. Experience at other sand and gravel mine sites in similar geologic settings shows that groundwater levels tend to fluctuate between two to four feet each year; levels are highest in the summer and lowest in the winter and early spring. Martin Marietta will conduct monthly water level monitoring for the five monitoring wells around Windsor East during dewatering and until groundwater levels have recovered once dewatering ends.

Groundwater samples will be collected to document baseline water quality prior to mining, then determine whether any changes have occurred as a result of mining activities. One quarterly water quality sample for laboratory analysis will be collected during each of the five quarters of monitoring to document the baseline water quality around the mine. Based on the historical water level fluctuations observed in the wells associated with the Parsons Mine, the seasonal high and low water levels for groundwater have been evaluated. Water levels are seasonally at their highest elevations in August or September following the irrigation season, and typically at their lowest elevations in February to March when irrigation has been suspended for the longest period of time. During high groundwater levels, the sample is expected to be representative of the groundwater which flows from the agricultural fields toward the river, and during the periods of low groundwater the sample is expected to be representative of alluvial channel water flowing from the west. After five quarters, water quality sample collection will continue to be conducted twice per year while mining, with sample collection timed to be consistent with high and low groundwater levels. The results of water quality sample analysis will be provided to DRMS following the baseline water quality evaluation, and during annual reporting thereafter.

Appendix G-3 includes procedures for collecting water samples. These procedures include a process of pumping to purge standing well water, then using the pump to remove water for sample collection, then placing the water in sample bottles obtained from the analytical laboratory. At the end of purging, the pH of the water will be recorded using a handheld pH meter. Samples for dissolved constituents, primarily inorganics and metals, will first be filtered through a 0.45-micron filter to remove suspended solids. Samples will then be stored on ice in a cooler for transport and submitted for analysis of the constituents listed in Table 5 under chain-of-custody protocols.

If sufficient data is collected during the life of the mining operation, and a demonstration can be made that project impacts to the groundwater system have been minimized, Martin Marietta may request the approval of a Technical Revision to revise the water level monitoring frequency or water quality sample collection frequency at a later date.

2.2.3 Domestic and Irrigation Water Wells

No active water wells (water-supply wells) were present within 600 ft of the lease area.

2.2.4 Dewatering Discharge

Based on data collected from monitoring wells on the adjacent Parsons Mine property, the depth to groundwater fluctuates by two feet depending on the season but averages about 7 feet below ground surface. Due to the absence of large quantities of potential pollutants on site (no on-site processing or concrete or asphalt production), the mining and reclamation operations are not likely to affect groundwater quality on or off the site.

Martin Marietta's Parsons facility complies with applicable requirements in the site CDPS General Permit COG501594 for Discharges Associated with Sand and Gravel Mining and Processing. CDPHE WQCD considers stormwater runoff combined with mine dewatering water to be process water. Current discharges at the Martin Marietta Windsor East Site and Parsons Pit are permitted as process water. As such, process water discharges are subject to the process water provisions in the general permit. Martin Marietta plans to obtain a City of Windsor Grading, Erosion and Sediment Control Plan (GESCP) Permit and comply with applicable requirements as stated in the City of Windsor's Municipal Code/Ordinance Chapter 13, Article, Stormwater Quality.

2.3 MITIGATION

The available monitoring well data will be used to identify changes in alluvial groundwater flow associated with mining and reclamation activities. Baseline data collected from the monitoring program will provide a range of relative water levels associated with pre-mining groundwater conditions. These data will be utilized to evaluate the nature and extent of the change to the prevailing hydrologic balance and if necessary, provide for the development of corrective actions. Well owners in the section below refer specifically to owners of wells from which extracted water is put to beneficial use, such as water wells, irrigation wells, etc. Owners of monitoring

wells are not considered well owners in this context since a change in water levels for these wells does not represent material damage.

In the event of a well owner complaint, Martin Marietta commits to reporting any complaints received from well owners to the DRMS within 48 hours, investigating the complaint as soon as practical, and submitting the results to the DRMS for evaluation within 30 days.

For the investigation, the first level of response will be to review water level data from the monitoring well network and, if available, a measurement of the water level in the plaintiff's well. Information will be evaluated to determine the plaintiff's complaint may be tied to dewatering or the lined reservoirs. If the data indicates that there is no reason to believe the plaintiff's well was impacted by dewatering or the lined reservoirs, that will conclude the action taken by Martin Marietta. If the data does not clearly show there is no impact, as a second level of response, Martin Marietta will present a contract to the well owner requesting access to the well to perform mechanical and electrical inspection and testing of the well and associated system, e.g. pressure tank. The agreement will explain that if the problem with the well is not due to a lower water level and is instead due to a mechanical or electrical issue, the well owner will be responsible for the repairs. If the well is determined to be in good working order and the problem is due to a lower water level, then the mining-associated impacts will be addressed to the satisfaction of the DRMS. If the DRMS determines that the impact on a well for which temporary mitigation has been initiated is not a result of Martin Marietta's activities or is not solely a result of Martin Marietta's activities, Martin Marietta will reduce or cease mitigation accordingly.

In the event of a complaint that a well has become unusable, and based on the inspection results described above, Martin Marietta will implement mitigation measures within 7 days. Mitigation measures would include providing a temporary alternative water supply that meets the documented historic well production or need until further investigation can be conducted to determine if the well condition is due to the mining operation.

The DRMS, and potentially the Mine Land Reclamation Board (MLRB), are responsible for determining if mitigation is required, as well as when and how any mitigation measures are implemented and discontinued after the initial complaint is received. Should DRMS or MLRB conclude that mitigation action is required, Martin Marietta will begin to implement one or more mitigation measures.

Temporary mitigation measures may include, but are not limited to:

- Compensation for well owners to use their existing treated water system to replace the well production loss;
- Provision of a water tank and delivery water as necessary to meet documented historic well production or need; and
- Other means acceptable to both the well owner and Martin Marietta.

Long-term mitigation measures may include, but are not limited to:

- Cleaning a well to improve efficiency.
- Providing an alternative source of water or purchasing additional water to support historic well use with respect to water quantity and quality. If needed, water quality parameters will be checked in affected wells to ensure alternative sources support the historic use.
- Modifying a well to operate under lower groundwater conditions. This could include deepening existing wells or lowering the pumps. All work would be completed at Martin Marietta's expense except for replacing equipment that was non-functional prior to mining.
- If existing wells cannot be retrofitted or repaired, replace the impacted well with a new replacement well.
- Design and installation of a cistern.

If a groundwater mitigation action is required, Martin Marietta will notify the DRMS of the condition, action taken and report the results and present a plan for monitoring the mitigation.

FIGURES















Permit	Contact Name	Town	Range	Section	0160	040	итм х	итм у	Distance	< 600 ft	< 0.5 m	i Permit Category	Permit	Construction	Use(s)	Flevation	Depth S	creen	Screen	More Info
Number		ship								?	?	· · · · · · · · · · · · · · · · · · ·	Issued	Date	000(0)		- optim	Тор	Bottom	
280593-	MARTIN MARIETTA MATERIALS INC	6.0 N	67.0 W	36	NE	NW	513402.6	4477581	< 100 ft	Yes	Yes	Monitoring/Observation	05/07/09	04/20/07	Monitoring/Sampling	4725	14	6	14	https://dwr.state.co.us/Tools/WellPermits/3639673L
277000-	HALL-IRWIN CORPORATION	6.0 N	67.0 W	25	SE	SW	513411.5	4477818	< 100 ft	Yes	Yes	Monitoring/Observation	03/28/08	03/01/07	Monitoring/Sampling	4727	14	4	15	https://dwr.state.co.us/Tools/WellPermits/3627148E
89706A	LAUER BRETT T & MARY K	6.0 N	67.0 W	26	SE	SE	512509.3	4477876	640 ft	No	Yes	Residential	04/21/77	04/29/77	' Domestic		32	17	32	https://dwr.state.co.us/Tools/WellPermits/9065892
280591-	MARTIN MARIETTA MATERIALS INC	6.0 N	67.0 W	36	NE	SW	513702.1	4477332	900 ft	No	Yes	Monitoring/Observation	05/07/09	04/20/07	Monitoring/Sampling	4723	15	4	14	https://dwr.state.co.us/Tools/WellPermits/3639673J
280588-	MARTIN MARIETTA MATERIALS INC	6.0 N	67.0 W	36	NE	NW	513702.5	4477496	940 ft	No	Yes	Monitoring/Observation	05/07/09	04/19/07	Monitoring/Sampling	4724	16	6	14	https://dwr.state.co.us/Tools/WellPermits/3639673G
280590-	MARTIN MARIETTA MATERIALS INC	6.0 N	67.0 W	36	NE	SW	513594.4	4477089	960 ft	No	Yes	Monitoring/Observation	05/07/09	04/20/07	Monitoring/Sampling	4727	16	6	16	https://dwr.state.co.us/Tools/WellPermits/3639673I
1472-R-R	WEST WELD AG I	6.0 N	67.0 W	35	SE	NE	512410.1	4476792	1300 ft	No	Yes	General Purpose	04/29/82		Irrigation					https://dwr.state.co.us/Tools/WellPermits/0221570
277001-	HALL-IRWIN CORPORATION	6.0 N	67.0 W	25	SE	SW	513792.4	4477895	1320 ft	No	Yes	Monitoring/Observation	03/28/08	03/02/07	Monitoring/Sampling	4724	9	4	10	https://dwr.state.co.us/Tools/WellPermits/3627148F
113762A	M WATERCO LLC	6.0 N	67.0 W	25	SW	NE	513394.6	4478305	1700 ft	No	Yes	Residential	04/21/80	04/28/80	Domestic, Stock		25	12	25	https://dwr.state.co.us/Tools/WellPermits/0914278
280589-	MARTIN MARIETTA MATERIALS INC	6.0 N	67.0 W	36	NE	SE	513941.6	4477286	1750 ft	No	Yes	Monitoring/Observation	05/07/09	04/19/07	Monitoring/Sampling	4722	18	6	16	https://dwr.state.co.us/Tools/WellPermits/3639673H
		6 0 N	67 O.W	26	NE	C E						Monitoring Hole								
46989-MH	PARSONS, SALLY	0.0 N	07.0 W	50	INE	35	514004.4	4477189	1970 ft	No	Yes	(Notice of Intent)	04/17/07	04/19/07	Monitoring/Sampling	4722	18	6	16	https://dwr.state.co.us/Tools/WellPermits/0046989
276998-	HALL-IRWIN CORPORATION	6.0 N	67.0 W	25	SE	NW	513410.8	4478397	1980 ft	No	Yes	Monitoring/Observation	03/28/08	03/01/07	Monitoring/Sampling	4740	24	4	25	https://dwr.state.co.us/Tools/WellPermits/3627148C
280592-	MARTIN MARIETTA MATERIALS INC	6.0 N	67.0 W	36	NE	SE	514062.2	4477002	2300 ft	No	Yes	Monitoring/Observation	05/07/09	04/20/07	Monitoring/Sampling	4724	17	6	16	https://dwr.state.co.us/Tools/WellPermits/3639673K
310649-	GREAT WESTERN DEVELOPMENT CO	6.0 N	67.0 W	26	SE	NE	512567.4	4478569	2580 ft	No	Yes	Monitoring/Observation	08/22/18	07/20/17	Monitoring/Sampling	4758	26			https://dwr.state.co.us/Tools/WellPermits/3688007
34951-M	EASTMAN, KODAK	6.0 N	67.0 W	35	NW	NE	511773.7	4477440	2790 ft	No	No	Monitoring/Observation	04/11/89	05/10/89	Monitoring/Sampling		10	5	10	https://dwr.state.co.us/Tools/WellPermits/02975460
273582-	BROE LAND ACQUISITIONS II LLC	6.0 N	67.0 W	35	NW	SE	511749.1	4477321	2800 ft	No	No	Residential	05/14/07	12/13/07	Commercial		32	12	32	https://dwr.state.co.us/Tools/WellPermits/3616219
80887-F	FRONT RANGE ENERGY LLC	6.0 N	67.0 W	26	SE	NW	512052.5	4478393	2880 ft	No	No	General Purpose	05/09/17	01/23/06	Industrial, Irrigation, Other	r				https://dwr.state.co.us/Tools/WellPermits/3679484A
34953-M	EASTMAN, KODAK	6.0 N	67.0 W	26	SW	SE	511752.9	4477922	2900 ft	No	No	Monitoring/Observation	04/11/89	05/08/89	Monitoring/Sampling		18	8	18	https://dwr.state.co.us/Tools/WellPermits/0297546Q
43115-	HENSEL PHELPS CONST	6.0 N	67.0 W	26	SE	NW	511997.7	4478388	2950 ft	No	No	Residential		09/19/70	Domestic		29			https://dwr.state.co.us/Tools/WellPermits/9064312
34954-M	EASTMAN, KODAK	6.0 N	67.0 W	26	SW	SE	511761.9	4478175	3200 ft	No	No	Monitoring/Observation	04/11/89	05/10/89	Monitoring/Sampling		18	8	18	https://dwr.state.co.us/Tools/WellPermits/0297546R
80889-F	FRONT RANGE ENERGY LLC	6.0 N	67.0 W	26	SE	NW	511838.4	4478531	3690 ft	No	No	General Purpose	05/09/17	02/01/06	Industrial, Irrigation, Other	r				https://dwr.state.co.us/Tools/WellPermits/3679484C
34952-M	EASTMAN, KODAK	6.0 N	67.0 W	26	SW	SE	511484.6	4478135	3980 ft	No	No	Monitoring/Observation	04/11/89	05/10/89	Monitoring/Sampling		16	6	16	https://dwr.state.co.us/Tools/WellPermits/0297546P
317847-	JOSEPH ENERGY LLC	6.0 N	67.0 W	26	SW	NE	511413	4478225	4280 ft	No	No	Monitoring/Observation	07/01/20	03/19/20	Monitoring/Sampling	4753	13			https://dwr.state.co.us/Tools/WellPermits/10004233
34941-M	EASTMAN, KODAK	6.0 N	67.0 W	34	SE	NE	510971.7	4476873	5300 ft	No	No	Monitoring/Observation	04/11/89	05/08/89	Monitoring/Sampling		16	6	16	https://dwr.state.co.us/Tools/WellPermits/0297546E

Table 2. Parsons Mine Well C	Construction Summarv
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			Land					Depth to
Well	Loc	ation	Surface	Screeneo	Interval	Depth t	o Water	Bedrock
	Latitude	Longitude	Elevation (ft asl)	Top of screen (ft BTOC)	Bottom of screen (ft BTOC)	Date	Measured (ft BTOC)	(ft BTOC)
MW-1	40 27'09.1 N	104 49'40.2 W	4704	7.2	15.2	4/14/2022	13.25	15
MW-2	40 27'23.0 N	104 49'40.2 W	4707	19.2	29.2	4/14/2022	15.20	28
MW-3	40 27'28.6 N	104 49'43.7 W	4742	20.7	30.7	4/14/2022	16.73	29
MW-4	40 27'08.0 N	104 50'03.3 W	4731	4.7	11.7	4/14/2019	4.43	12
MW-5	40 27'28.1 N	104 50'06.5 W	4745	18.7	28.7	4/14/2022	19.20	29
MW-6	40 27'18.1 N	104 50'12.9 W	4747	13.7	23.7	4/14/2022	17.94	24
MW-7	40 26'52.2 N	104 50'14.7 W	4721	5.7	13.7	4/14/2022	13.23	14
MW-8	40 26'42.3 N	104 50'05.4 W	4721	6.3	16.3	11/14/2013	9.28	17
MW-9	40 26'40.0 N	104 50'23.0 W	4731	5.7	15.7	4/14/2022	11.80	14
MW-10	40 26'47.8 N	104 50'18.5 W	4731	3.7	13.7	4/14/2022	10.80	14
MW-11	40 26'37.0 N	104 50'03.3 W	4727	5.7	13.7	4/14/2022	10.55	16
MW-12	40 26'55.8 N	104 50'30.9 W	4728	5.7	13.7	4/14/2022	11.90	13
MW-13	40 26'55.4 N	104 49'41.5 W	4717			4/14/2022	11.03	
MW-14	40 26'46.1 N	104 49' 54.7 W	4720			4/14/2022	10.60	
Note: Lan	d surface elevation	ons, provided by	Martin Marie	etta, are belie	ved to be estin	mated from loo	cal topographic	тар

Table 3. Windsor East Monitoring Well Construction Summary

14/011			Measuring Point	Screeneo	l Interval		Dauth		Depth to
weii	LOCa	tion	Top of	(п в	Bottom		Depth	to water	веагоск
			Casing	Top of	of	Total		Measured	
	Northing	Easting	(ft amsl)	Screen	Screen	Depth	Date	(ft BTOC)	(ft BTOC)
MW-05	1407363.18	3180756.42	4741.04	4.0	24.0	24.0	8/12/22	8.9	22.5
MW-06	1406448.96	3180558.21	4734.84	7.0	17.0	19.0	8/12/22	7.9	16
MW-07	1405083.81	3180568.65	4733.71	6.0	16.0	17.5	8/12/22	10.4	16
MW-10	1407540.29	3183012.41	4728.44	8.0	18.0	20.0	8/12/22	8.8	16
MW-11	1406241.22	3183097.25	4727.64	6.0	16.0	20.5	8/12/22	10.2	15
Notes: an Coordinat	nsl = above me tes are reporte	ean sea level; ed in Colorado	BTOC = Belo State Plane I	w Top of (North (US	Casing ft, NAD 83)	-		

Well	MW-4	MW-6	MW-7	MW-12
Pre-mining Conditions				
Minimum	5.3	7.0	4.2	5.2
Maximum	10.1	13.5	6.1	7.2
Average	7.3	8.5	5.3	6.3
Mining Conditions				
Minimum	7.0	5.9	0	1.0
Maximum	7.3	8.7	6.9	3.3
Average	7.2	6.6	1.7	1.7
Est Drawdown / Change in Saturated Thickness	0.1 ft	1.9 ft	3-5 ft	4.6 ft

Table 4: Saturated Thickness and Dewatering Impacts at Parsons

Table 5. Water Quality Sampling Parameters

Parameter	Applicable Water Quality Standard Concentration	Comments
Aluminium - Dissolved	5 mg/L	Filter in field (0.45 micron)
Antimony - Dissolved	0.006 mg/L	Filter in field (0.45 micron)
Arsenic - Dissolved	0.01 mg/L	Filter in field (0.45 micron)
Barium - Dissolved	2.0 mg/L	Filter in field (0.45 micron)
Beryllium - Dissolved	0.004 mg/L	Filter in field (0.45 micron)
Boron - Dissolved	0.75 mg/L	Filter in field (0.45 micron)
Cadmium - Dissolved	0.005 mg/L	Filter in field (0.45 micron)
Chromium - Dissolved (CrVI)	0.1 mg/L	Filter in field (0.45 micron)
Cobalt - Dissolved	0.05 mg/L	Filter in field (0.45 micron)
Copper - Dissolved	0.2 mg/L	Filter in field (0.45 micron)
Fluoride - Total F	2.0 mg/L	
Iron - Dissolved	0.3 mg/L	Filter in field (0.45 micron)
Lead - Dissolved	0.05 mg/L	Filter in field (0.45 micron)
Lithium - Dissolved	2.5 mg/L	Filter in field (0.45 micron)
Manganese - Dissolved	0.05 mg/L	Filter in field (0.45 micron)
Mercury - Dissolved	0.002 mg/L	Filter in field (0.45 micron)
Molybdenum - Dissolved	0.21 mg/L	Filter in field (0.45 micron)
Nickel - Dissolved	0.1 mg/L	Filter in field (0.45 micron)
Nitrate (NO3)	10.0 mg/L as N	Filter in field (0.45 micron)
Nitrite (NO2)	1.0 mg/L as N	Filter in field (0.45 micron)
Nitrate+Nitrite (NO2+NO3), dissolved	10.0 mg/L as N	Filter in field (0.45 micron)
рН	6.5 - 8.5	Measure in field
Selenium - Dissolved	0.02 mg/L	Filter in field (0.45 micron)
Silver - Dissolved	0.05 mg/L	Filter in field (0.45 micron)
Sulfate - Total	250 mg/L	
Thallium - Dissolved	0.002 mg/L	Filter in field (0.45 micron)
TDS	400 mg/L	Filter in field (0.45 micron)
Uranium - Dissolved	0.02 mg/L	Filter in field (0.45 micron)
Vanadium - Dissolved	0.1 mg/L	Filter in field (0.45 micron)
Zinc - Dissolved	2 mg/L	Filter in field (0.45 micron)
Gross Alpha Particle Activity	15 pCi/L	
Chloride, dissolved	250 mg/L	Filter in field (0.45 micron)

Notes: Detection Limit / Reporting Limit must be equivalent to the water quality standard or lower.

APPENDIX G-1 BORING LOGS AND WELL COMPLETION DIAGRAMS WINDSOR EAST AND PARSONS MINE MONIT<u>ORING WELLS</u>

O'ta Namo:		6	mat	ú)ec	Martin Marietta Page 1 of 2	-
Site Name. Site Name. Boring Num Latitude: Date Started Rig Type: Drilling Meth Surface Ele Overburden Boring Tota	n: ber: d: d: d: d: d: d: d: d: d: d: d: d: d:	M H (Fe (Fe th (F	$\frac{1}{10} - \frac{5}{10}$	2 98 2 Ste 7	13 4	Logged By: <u>Coordination</u> Longitude: <u>-104.85053</u> <u>-104.85053</u> <u>Bate Completed:</u> <u>8-8-22</u> <u>Drilling Contractor: Authentic Orilling</u> Borehole Diameter: <u>825</u> Depth to Water (Feet): <u>7.5</u> Depth to Bedrock (Feet): <u>22.5</u> Backfill Type: <u>Dell Construction</u>	- 130 Acc
Depth (Feet)		Sample Interval	Grain Size (1)	Rounding (2)	Grading ⁽³⁾	Time, Material Description, and Comments	
						Overburden, the Silty clay, stiff, Brown	

T 7.5 Clarey sond, moist, rig chatter, Brown, wet r Mitte Sandy gravel, clean, wet, gravel to cobble size 15 rig chatter @ 17.5' necovering sand, still grovely sand, wets 10 Bedrock-gray claystone, split spon run for confirmat 25-16-38-50 for 3" Drilled to 25° for well construction hole kept filling before price was 3 set (1) Grain Size:B=Boulder, P=Cobble, G=Gravel, S=sand, V=very, F=Fine, M=Medium, C=Coarse

(2) Rounding: R=rounded, r=subrounded, a=subangular, A=angular



	(+		b	Martin Marietta Page <u>2</u> of <u>2</u>	
Site Name: Site Location: Boring Number: Latitude: Date Started: Rig Type: Drilling Method: Surface Elevation Overburden Thic Boring Total Dep	M H H Knes th (Fe	w = 0 w	5 22 200 92	A 0,5	Logged By: Rod Preston Longitude: Date Completed: <u>8-8-22</u> Drilling Contractor: <u>Authentic Drilling</u> Borehole Diameter: <u>8.25</u> Depth to Water (Feet): <u>7.5</u> Depth to Bedrock (Feet): <u>23.5</u> Backfill Type: <u>Well</u> Construction	
Depth (Feet)	Sample Interval) Grain Size ⁽¹⁾	S Rounding ⁽²⁾	Grading ⁽³⁾	Time, Material Description, and Comments	

Bentonite chip seal 1.5 Sond Screen 3-Schedule 40 riser pipe D 10. -010 Slotted Screen sched 15 Materials used Sond-Washed Silia Sand 10/20 50 00 bog 20-Bentonite? Pure goto medium chips 50 1/2 pdd crumbles 7 8-20 cetco Partland Covent type I/I 9466 600 detting well sond filled in as we tried to soupe in, plugging the hole ended up lifting ter Jut get well sett. 44

(1) Grain Size:B=Boulder, P=Cobble, G=Gravel, S=sand, V=very, F=Fine, M=Medium, C=Coarse (2) Rounding: R=rounded, r=subrounded, a=subangular, A=angular



Xran out of pure

gold, used crumbles

	Site Name: Site Location: Boring Number: Latitude: Date Started: Rig Type: Drilling Method: Surface Elevatio Overburden Thio Boring Total Dep	G 40. 81 Ho pon (Fe ckness pth (F	$real P_1 + 01/2022KSS - 01/20221/20$	We 8 W-(30) 8 30) 8 8 30) 8 9	12 0 13 0 7.3 0 7.3 0 7.3 0 7.3 0 7.3 0 7.3 0 7.3 0 7.3 0 7.3 0 7.3 0	Martin Marietta Page of of Martin Marietta Page of of Construct to CO Road Z3 Logged By: David Bieber Longitude: 107,8512 C Date Completed: 8112022 14:30 Drilling Contractor: Authentic Drilling Borehole Diameter: 81/2 inch Depth to Water (Feet): 8 Depth to Bedrock (Feet): 8 Depth to Bedrock (Feet): 16 16 Backfill Type: Monital Well	
	Depth (Feet)	Sample Interval	Grain Size ⁽¹⁾	Rounding ⁽²⁾	Grading ⁽³⁾	Time, Material Description, and Comments	3
TD 19	8 10 16 15 16		YF-V(R		Silly sand with gravel and cobble moderate brown, slighty tirm, wet cobbles to 3 miles Bebrock Claystone medicine to dark gray, St. ft. moist	The second second
						Filter Pack & to 19 feel 10/20 50 # × 5 Benton le Chips 3 to 6 feel 50# × 2 Type 1/49 Connect 5% Bentonic 0 to 3 100 # × 1 Schedule 40 PVC Ø,010 screen 7 to 17 fet Behadute 40 PVC Gasing + 3 to 7 feel	

(2) Rounding: R=rounded, r=subrounded, a=subangular, A=angular

Martin Marietta Page of Wes reat Site Name: Site Location: Corner Logged By: Dawn Boring Number: che GI -MW-O Longitude: - 104 27 Latitude: 44353 Date Completed: 08/01 12027 12:05 Date Started: 10:00 7077 NU Drilling Contractor: A Rig Type: CMESS 300 Tract illini Borehole Diameter: 8-1/4 Drilling Method: Hollow Sta A Depth to Water (Feet): Surface Elevation (Feet): L 709 17-1/2 Depth to Bedrock (Feet): Overburden Thickness (Feet): Backfill Type: Mon Boring Total Depth (Feet): Dr feel ring 12 of Groundwater Sample Interval Grain Size⁽¹⁾ Rounding⁽²⁾ Grading⁽³⁾ Time, Material Description, and Comments + 3Depth Top ((Feet) 6-0 Overburde to modera Z RON Slighth MOIS truce 5 Sana gravel, moderal redd 005 10 gravel inch 1 serin d to Sa 15 16 16'22 20 ing 16 50 16 1/2 00 Well 0 both 5% Rentant Crubber 25 Filter 2 feel Srauf-100 # 1/11 Portland Can 001 Grout O Clips malis 5×50# 40 2" - Sch PVC .010 Slot Screen

(2) Rounding: R=rounded, r=subrounded, a=subangular, A=angular

16

(3) Grading: P=poorly graded, M=moderately graded, W=well graded, X=see description

1 1

		·		,		Martin Marietta Page of	1			
S	ite Name:	G	reet h	Jes-	en			_		
S	ite Location	: 1 ²	its	8	, 6	Vortheeast Carne		-		
В	oring Numb	er:	MW-1	0	~	Longitude: -104. 642.25		-		
	atte Started		\$ 907	02)	140 Date Completed: 2022 100	30	Los		
F	Rig Type:	Cn	1555	- 3	ov	Truck Drilling Contractor: Asthutic Drilli	_			
C	rilling Meth	od: -	lollow	Ste	er-	Borehole Diameter: 81/2 inch				
S	Surface Elev	ation (F	eet):		9	Depth to Water (Feet):		-		
F	Soring Total	Depth (Feet):		2	Backfill Type: Maarty Le	1			
	oning rotar				~		_			
	Depth (Feet)	Sample Interval	Grain Size ⁽¹⁾	Rounding ⁽²⁾	Grading ⁽³⁾	Time, Material Description, and Comments	Top of Grounawater		П	Ĩ
	0.					Overburde, Clayer Sill, Durk Brown,		ŀ	E	
						Subuty Stitle moist, sandy clay		+	JE	4
	5					Zone from 7 to stell	-		11/2] (
				-		Water rose to 6.15 feet	37		FHF.	17
9							2-	9	目	
	10					Silty, Clayey Coble Zone based on	57			
:						rig crane can berning				
19 -	15			-		Silt to sculy Silt, Moderate Gray Brown	_		1:1:	1
16 -				-		Stift, wet			:1:	
10						1.Sed roch			YV	T
	20	30-		-				L	下方	1-19
4700mm	5 19	-		-			+		~~~~	0
						4" Stichup on surface				
						Grand Trade Ily Partly D Can 1 4+00 matter	-14	12		
		-	-	+		E. R. I. I. M. O. Ci. This Fill	7	6		
		_		+	-	See 15m tomi te Medium Chips 1 to 9 50 th	4			
						Cusing 3ch 40 PVC & to + 3				
						Screep Sch 40 RVC DID Slot 18 to 8				
						Filler Park 10/20 5 1 20 to 7 50#291	4			
				+	1					

(2) Rounding: R=rounded, r=subrounded, a=subangular, A=angular

Site Name: Site Location: Boring Number: Latitude: Date Started: Rig Type: Drilling Method: Surface Elevatio Overburden Thio Boring Total Dep	M S M M M M M M M M M M M M M M M M M M	$\frac{1}{0.446}$ $\frac{1}{0.446}$ $\frac{1}{2022}$ $\frac{1}{100}$	Jes 1 68 300 51-0	15: 2 2 7 20	Martin MariettaPageofde dPit Area 8Logged By:David BiebsLongitude:-104.5421250Date Completed:50Date Completed:50Date Completed:50Date Completed:50Date Completed:50Date Completed:50Date Completed:50Date Completed:50Date Completed:50Depth to Water (Feet):27.636Depth to Water (Feet):12Depth to Bedrock (Feet):15Man. Facing Weil	1 : 40 1;	
Depth (Feet) 0 7 10 15	Sample Interval	Grain Size ⁽¹⁾	N Rounding ⁽²⁾	C Crading ⁽³⁾	Time, Material Description, and Comments Overburchen, Clayer S. H. Moderate brown slightly still, still, monst to moist Clayer Coboles, malerake granish brown, still, moist, cobbles to 3 inclus weather a Balman, clay patient, still noise	Top of Groundwater	11/11/1-16
- 16 19 - 20 15-41-50&3'					Filter Pach 10/22 Scal 201/2 to 5 free Bentonke Mel, un Chips 5 to 2 Beet Type 1/11 Partland Cenart 2 to Offe Schtjo PVC Screen On 010 Stal 16 to 66 Sch 40 PVC Cesary 6 feet to +3 leet 4"x y" Stich Up Well Box	et	50# ×61/4 50# ×61/4 50# × 2 100# ×1

(2) Rounding: R=rounded, r=subrounded, a=subangular, A=angular

Site Name:	R	verbe	ind	L	West Martin Marietta Page / of	[
Site Location:	CI	nkom	G	E	10		
Boring Number:	C	1-1-mi	JO	5	Logged By: David Brebe	er	
Latitude:	40	.057	76	7	15:42 Longitude: -104.84528	2	
Date Started:	81	2/2023	2		Date Completed:	11	
Drilling Method	U	16 55-	<u> </u>	0	Drilling Contractor: <u>Authence Un</u> Borehole Diameter: EL	<u> , .</u>	~
Surface Elevatio	n (Fe	et):	nun		Depth to Water (Feet):	1.	14 2
Overburden Thio	knes	s (Feet):		11	Depth to Bedrock (Feet):	6116	
Boring Total Dep	oth (F	eet):			Backfill Type: Man, toring W	2/1	
						5	
Depth (Feet)	Sample Interval	Grain Size ⁽¹⁾	Rounding ⁽²⁾	Grading ⁽³⁾	Time, Material Description, and Comments	Top of Groundwate	
					Overburden, silt to sandy silt, moderale		
					to a popular source and substitutionst		
5 —					Ro: moist journe clay.	\vdash	
			<u> </u>				
~							
11-10-							
				<u> </u>	Sandy gravel, moderate reddish		
15					1 inch Finin dauch to coose sal	27	
15						Y	
					Sandy Silty moderate brown, loose to disht Stiff, wet		
20 -					Fining downward to silt.	-	20
					light brown,	-	
2516		,	-		Bedrah Classon darth and		
- 26					brawn, stiff, wet		
					Set well on 8/3/2022		
					Set Screen 24 to Deel		
					Set casine 10 to +3 feet		
					Filter Pach 25 thathe to the feel		
					Butinite 9 to 6 fect		

(2) Rounding: R=rounded, r=subrounded, a=subangular, A=angular

cui	ENT	La	farg	e N	orth A.	meric	a	BOREHOLE LOG		
PRC PRC) JEC	T LOC T NO	L F	-05	ndsor 38			Andy & Richard PAGEOF_3		
	NORTH						DRILL	LER DRILLING ENGINEERS INC. DATE START 4/18/2	2007	
	EAST						RIG	CME - 75 DATE FINISH 4/18/	DATE FINISH 4/18/2007	
G	GRD ELEV.						BITS 8	8.25" H.S.A. FLUIDS TOTAL DEPTH 16	,	
TO	TOC ELEV.						LOGG	ED BY Charoen S. WATER DEPTH 9	<i>.</i>	
	AMP	LE TY	PES:		<u></u>			SAMPLER SPECIFICATIONS:	 	
	CT Cuttings WS Wash SS Split Spoon NX NX Core DC Dry Core CS Continuous Sar Other						ampler	Length Z.5' Material Slee. 0.D. Z'' Liner		
DE	ртн	BIT	SAMP	SAMP	RECOV.	BLOWS	lev.	SURFACE CONDITION: Grass Sol		
() 	°T)	CASING	NO.	TYPE	FT/FT	per 6		SOIL/ROCK DESCRIPTION BG	HS Core	
0. For										
	0		[1				Augered to 3'		
								0 to 3.0 - Cutling - SILT AND		
لسبيا								CLAY. Brown, some sand trace		
The second	2							roots. Moist.		
hint	4	Q 25								
Line in	3					<u> </u>				
-11-		A.S.A	$\left\{ \right\}$		194	5		881 3' to 5'		
	-4	4.25" I.D.		SS <u>-1</u> 24"	8		3.0' TO 4.8' SILT AND CLAY. Brown			
цhi							stidt little sand little			
- L L L	5							stone up to 2-inch in diameter		
يبله								Moisi.		
	6							4.8 10 5.0 100 RECOVERT		
E.	-							50'to 90' Cutting SUT AND		
	+							CLAY Brown Little Sand Little		
1 uu	0							stone up to 2-inch in diameter		
1111	ð							Moist. Rough Drilling due to stone		
in the	q			ļ	ļ		_			
Lu Lu	,			92	10	7		SS2 9'toll'		
E	10				244	13		9.0' to 9.8' SAND AND GRAVEL		
								Brown med dense, little silt		
1.0	OCATION SKETCH							DENSITY: PROPORTIONS: REMARKS/WEATHER		
	Southeast of					0-10	JRANULAR: COHESIVE: Loose 0-4 Soft 0-10% Trace 60F SUVMA			
	Liter 1: Open 1 10-30 Med Dense 4-8 Med Stiff 10-20%							d Dense 4-B Ned Stiff 10-20% Little		
	،9ن	2 41	pich	INEC (IVIT			Very	y Dense 15-30 Very Stiff 35-50% And		
	iog status									

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EnviroGroup Limited Centernial, Colorado
CLIENT Latarge North America

BOREHOLE LOG

NORTH EAST GRD ELEV TOC ELEV. SAMPLE TYPES. CT Cuttings SS Split Spoon DC Dry Core Other.	WS Wash NX NX Cd CS Contin	ore	DRILLI RIG BITS & LOGGE	ER DRILLING ENGINEERS INC. CME 75 .25"H.S.A. FLUIDS - ED BY Charoen S.	DATE START 4 DATE FINISH 4 TOTAL DEPTH	/18/20 /18/20 16	07 07
EAST CRD ELEV TOC ELEV. SAMPLE TYPES. CT Cuttings SS Split Spoon DC Dry Core Other.	WS Wash NX NX Cd CS Contin	Dre	RIG BITS Ô LOGGE	CME 75 .25"H.S.A. FLUIDS - D BY Charoen S.	DATE FINISH 4 TOTAL DEPTH	18/20	07
CRD ELEV TOC ELEV. SAMPLE TYPES. CT Cuttings (SS) Split Spoon DC. Dry Core Other.	WS Wash NX NX Co CS Contin	ore	BITS 8	.25"H.S.A. FLUIDS - D BY Charoen S.	TOTAL DEPTH	16'	
TOC ELEV. SAMPLE TYPES. CT Cuttings SS Split Spoon DC Dry Core Other.	WS Wash NX NX Co CS Contin	ore	LOGGI	D BY Charoen S.			
SAMPLE TYPES. CT Cuttings SS Split Spoon DC Dry Core Other.	WS Wash NX NX Co CS Contin	ore			WATER DEPTH	9'	
		uous Sai	mpler	SAMPLER SPECIFICATIONS: Length <u>2.5</u> 0.0. <u>2</u> 1.0. <u>1.7</u> "	Material <u>Stee</u> Liner <u> </u>	-1	
DEPTH BIT SAMP (FT) CASING NO.	SAMP RECOV. TYPE FT/FT	BLOWS per 6"	SYM	SURFACE CONDITION:G.T.A.S. SOIL/ROCK DESCRIP	S	SOIL VAPO	R I
-10		 		little stone up to 2	" in diantan	LAIPT	
				9.8' to 11.0' NO RECO	VERY	Wei	
				Augered to 1	4'		
				GRAVEL Some silt	SOME STONE		
E-13 8 25				Rough drilling due	to stone	İ	
E H.S.A				. <u> </u>		<u>}</u> }	
E-14 4.25"				0.0.7			
1D.	24	16		883 14/ to	. 16' .		
	24	25		hory etiff some	Brown	┨╍╍┧╼╍┥	
E16		32		15.2' to 16 0' - SILTS	FONE Grow	┼╌┼╌┼	
	END OF B	PREHO	LE	very stiff trace	sand.	┨──┤	
E17				lightly weathered.	very moist	<u> </u> -	
				Augered to 15.	.5'		
E-18				END OF BODEHOU	E At 14 a		
EIG				Install monitoring u	(all MINI-1	┝━━┤╸	
				<u> </u>		┝╌┼╌┼	
E-70						╞╴┼╾┾	
LOCATION SKETCI	1			DENSITY: PROPORTIONS:	REMARKS/WEATHEF		
See plau	n	GR 0-10 10-30 30-50 >50	ANULA Med Very	AR: COHESIVE: Loose 0-4 Soft 0-107 Trace Dense 4-B Med Stiff 10-207 Little Dense 8-15 Stiff 20-357 Some Dense 15-30 Very Stiff 35-507 And	60F Sunny	<u>.</u>	

LOG STATUS.

PRELIMINARY:

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CLIENT	La	farg	e No	orth An	meric	a	BOREHOLE LOG	
PROJEC PROJEC	CT LOC	ATION	- 05	ndsor, 38	co		Andy & Richard BH NO.	,
NORT	н	<u></u>				DRILLE	ER DRILLING ENGINEERS INC. DATE START 4/18	12007
EAST						RIG	CME-75 DATE FINISH 4/18	12007
GRD	ELEV.					BITS 8	3.25"H.S.A. FLUIDS TOTAL DEPTH 16'	······
тос	ELEV					LOCGE	ED BY Charoen S. WATER DEPTH 9'	
SAMP CT C SS S DC D Other	LE TY utting plit Sp ry Co r	PES: s boon re	}	WS Wash NX NX C CS Contir	ore Juous S	ampler	SAMPLER SPECIFICATIONS: Length 2.5 O.D. 2" I.D. 1.7 Other	
DEPTH BIT SAMP SAMP RECOV. BLOWS						SYM	SURFACE CONDITION: Grass Sol	L VAPOR
(FT) 	CASING		TYPE	F.L. F.L.	per 6		SOIL/ROCK DESCRIPTION BG	HS Core
							2" PVC 0.01" slotted screen	
							8' screen	
							PUREGOLD BENTONITE COARSE	
							CHIP (3/8 + 10 3/4)	
E 2							Silica Sand 10/20	
<u>, 1111</u>	8.25							
5	H.S.A							<u> </u>
4							Lock	
L.LL							Casing	
£-5	4.25 T D						Cap Diane = 3 to = 7 Control of all	├ ──┝
	1.0						Screw 7.2 - 152 Benton to 2'	<u> </u>
4.6							Cap 15.2'-15.5' sand 6' to 16'	
1								+
1-8								
1111								<u> </u>
ц. П								
E 10								+
								++
LOCA	I TION	L L SKETC	<u> </u> :н	1	<u></u>		DENSITY: PROPORTIONS DEMARKS / MELANING	
See Plan GRANUL See Plan GRANUL 10-30 Med 30-50 >50 Very						GRANUI 0 Med 10 Very	AR: COHESIVE: Loose 0-4 Soft 0-10% Trece 60° F 1 Dense 4-6 Med Stiff 10-20% Little Dense 6-15 Stiff 20-35% Some SUMMY y Dense 15-30 Very Stiff 35-50% And	

PRELIMINARY ______ FINAL: _____



PROJECT LOCATION Windsor, CO Bit No. Z PROJECT NO LF-0538 Andy 4 Richard PAGE 1 of 4 NURTH DRILLER DRILLING ENGINEERS INC. DATE START 4/18/200 EAST RIG CME - 75 DATE FINISH 4/18/200 GRD ELEV. BITS 8,25 "H.S.A. FLUIDS TOTAL DEPTH 30.3' TOC ELEV. LOGGED BY Charoen S. WATER DEPTH 14' SAMPLE TYPES. CS Continuous Sampler SAMPLER SPECIFICATIONS: Length 2.5' Naterial Steel DC Dry Core CS Continuous Sampler SURFACE CONDITION: Grass Soil vapor Other: GRD ELEV. BLOWS SYM SURFACE CONDITION: Grass Soil vapor DEPTH BIT SAMP SAMP RECOV. BLOWS SYM SURFACE CONDITION: Grass Soil vapor O Augered to 4' O to 4.0' Cutting - SILT AND Ed Hs Cord O Augered to 4' O to 4.0' CUAY. Brown little sand little Grass
NORTH DRILLER DRILLER DRILLING ENGINEERS INC. DATE START $4/18/200$ EAST RIG CME - 75 DATE FINISH $4/18/200$ GRD ELEV. BITS 8.25" H.S.A. FLUIDS TOTAL DEPTH $30.3'$ TOC ELEV LOGGED BY Charoen S. WATER DEPTH $14'$ SAMPLE TYPES. CT Cuttings WS Wash SAMPLER SPECIFICATIONS: Material Steel DC Dry Core CS Continuous Sampler $0.D$ $2''$ $0.D$ $2''$ DEPTH BIT SAMP SAMP RECOV. BLOWS per 6" SYM SURFACE CONDITION: Grass soil valoe DEPTH BIT SAMP SAMP RECOV. BLOWS per 6" SYM SURFACE CONDITION: Grass Soil valoe O Augered to 4' O to 4.0' - Cutting - SILT AND BC HS Core O CLAY. Brown little sand little gravel trace rante Moist
Mathin DATLEER Stricting Elogination (Constructing Elogination (Constructing Elogination (Construction)) Date start 4/18/200 EAST RIG $CME - 75$ DATE FINISH 4/18/200 GRD ELEV. BITS 8.25" H.S.A. FLUIDS TOTAL DEPTH 30.3' TOC ELEV LOGGED BY Charoen S. WATER DEPTH 14' SAMPLE TYPES. SAMPLER SPECIFICATIONS: Material GS Split Spoon NX NX Core D. Z'' DC Dry Core CS Continuous Sampler D. Z'' I.D. L.7" Other Soll vapor Other: SOL VAPOR SURFACE CONDITION: Grass Soll VAPOR NO. TYPE FT/FT Per 6" SYM SURFACE CONDITION: Grass Soll vapor PID FID O Augered to 4' O to 4.0' Cutting - SILT AND Edition I I I I III Structure for a site of the site of
Ind CITE 19 DATE PINISH 4/18/200 GRD ELEV. BITS 8.25 "H.S.A. FLUIDS TOTAL DEPTH 30.3' SAMPLE TYPES. CT Cuttings WS Wash NX NX Core SAMPLER SPECIFICATIONS: Length 2.5 DC Dry Core CS Continuous Sampler Material Stee! DEPTH BIT SAMP SAMP RECOV. BLOWS SOIL VAPOR O ID 1.7" Other Other SOIL VAPOR PDC TYPE FT/FT per 6" SYM SURFACE CONDITION: Grass SOIL VAPOR PDC TYPE FT/FT per 6" SYM SURFACE CONDITION: Grass SOIL VAPOR O Augered to 4' Oto 4.0' - Cutting - SILT AND Oto 4.0' CLAY. Brown little sand little Grass
Introduction of the product of the pro
SAMPLE TYPES. WS Wash SAMPLER SPECIFICATIONS: Material Steel CS Split Spoon NX NX Core CS Continuous Sampler D.D. Z' Material Steel Other: Other: I.D. I.T Other Other Soll vapor Sole DEPTH BIT SAMP SAMP RECOV. BLOWS SYM SURFACE CONDITION: Grass Sole vapor OFT CASING NO TYPE FT/FT Per 6" SYM SURFACE CONDITION: Grass Sole vapor O Augered to 4' Oto 4. O' CLAY. Brown little sand little Grass O Qravel trace trace Material Sole vapor
CT Cuttings WS Wash SSD Split Spoon NX NX Core DC Dry Core CS Continuous Sampler Other: I.D. DEPTH BIT SAMP SAMP RECOV. BLOWS Provide SURFACE CONDITION: Grass Soil vapor VICTOR SURFACE CONDITION: Grass Soil vapor PID FID Formation Soil vapor Other: Soil vapor Other Soil vapor (FT) CASING NO. TYPE FT/FT per 6" SYM SURFACE CONDITION: Grass Soil vapor PiD FID FACE Soil vapor PiD Soil vapor BC HS Cor Soil vapor BC HS Cor Oto 4.0' Cutting - SILT AND CLAY Brown little sand little gravel Trace roots
DEPTH BIT SAMP SAMP RECOV. BLOWS SVM SURFACE CONDITION: Grass SOIL VAPOR (FT) CASING NO. TYPE FT/FT per 6" SYM SURFACE CONDITION: Grass SOIL VAPOR - O NO. TYPE FT/FT per 6" SYM SURFACE CONDITION: Grass SOIL VAPOR - O - O - O - O - O BLOWS SYM SURFACE CONDITION: Grass SOIL VAPOR - O
Augered to 4' O to 4.0' - Cutting - SILT AND CLAY Brown little sand little graved trace rents Moist
Augered to 4' 0 to 4.0' - Cutting - SILT AND CLAY Brown little sand little graved trace rents Moist
Augered to 4' o to 4.0' - Cutting - SILT AND CLAY Brown little sand little graved trace rents Moist
<u>oto4.0' - Cutting - SILTAND</u> <u>CLAY Brown little sand little</u> graved trace route Moist
CLAY Brown little sand little
En gravel trace rente Moiet
8.25
F-3 H.S.A
F4 # 3 SSI 4' to 6'
5 4.25" SS 22 4 4.0 to 5.8 SILT AND CLAY Brown
I.D. 24" 6 stiff little soud little grave Damp
-6 7 5.8' to 6.0 NO RECOVERY
Augered to 9'
6.0704.0 - Cutting SILTAND.
E8 CLAY. brown little sound, little
Eg yravel. Damp.
\mathbb{S} \mathbb
F10 3 24' 3 9.0' to 10.8' SILT AND CLAY Brown
med stiff trace sand
LOCATION SKETCH DENSITY: PROPORTIONS REMARKS / WEATURE
GRANULAR: COHESIVE:
$\bigcirc \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$
>50 Very Dense 15-30 Very Stiff 35-50% And

LOC STATUS

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PRELIMINARY: _____ FINAL: _____

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EnviroGroup Limited Centennial, Colorado

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CLIEN PROJE PROJE	T LA	Tara CATIO LF	NW NW	orth A indsor	meric , co	ca	BOREHOLE LOG BH NO. Z					
NOR	T1J						PAGE Z_OF Z	1				
FAS	; , , , , , , , , , , , , , , , , , , ,	<u> </u>		·····		DRILL	DRILLER DKILLING ENGINEERS INC. DATE START 4 /18/200					
CPD	FIEV					RIG	CINE 75 DATE FINISH 4/18/	2007				
	ELEV.		·····			BITS	56.25 H.S. A. FLUIDS - TOTAL DEPTH 30.3	/				
						LOGG	CED BY Charoen S. WATER DEPTH 14'					
	CT Cultings WS Wash (SS) Split Spoon NX NX Core DC Dry Core CS Continuous Sa Other						SAMPLER SPECIFICATIONS: Length 2.5' Material Steel O.D. 2'' Liner					
PDEPTI (FT)	BIT CASING	SAMP NO.	SAMP	RECOV. FT/FT	BLOWS	SYM	SURFACE CONDITION: Grass Soil	VAPOR				
					her 0		SOIL/ROCK DESCRIPTION	FID				
-10												
					4		10.8 to 11' NO RECOVERY					
E-11					6		The COVER I					
	1						Augered to 11/					
E-12							11'to 14' - Cutting - SILT AND					
1111							CLAY, Brown trace sand					
E-13	3 8.25						indice sound					
	H.S.A.											
E14	14 4 25"											
	1D.			\/_ [#]	6		SS 3 14 to 16					
E15				0	12		14' to 15.3' SAND AND GRAVEL					
<u>u lu</u>				24	14		Brown, med deuse some					
16					21		stone up to 2-inch diameter					
1111							trace silt trace clay WET					
17							15.3' to 16.0' NO RECOVERY					
							Augered to 19	<u> </u>				
E-18	8						16.0 TO 19.0 SAND AND GRAVEL					
							Brown some stone up to zinch					
EIG	9 184 15				15	+	diameter, trace silt, trace clay, WET					
	241 6				6		<u>SS4 19' to 21'</u>					
- 20	20 24 3					╉╌╌╌┨	14.0 10 20.5 SAND AND GRAVEL					
L							Brown, med deuse, some stone					
LOCA1	OCATION SKETCH						DENSITY: PROPORTIONS: REMARKS / WEATHER	╧╧╧╡				
,	GI 0-10 10-30 30-60 >50					Med 1 Very 1	LAR: COHESIVE: COHESIVE: Loose 0-4 Soft Dense 4-8 Med Stiff Dense 8-15 Stiff Dense 15-30 Very Stiff 35-507 And					
100 0	TATIC											

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EnviroGroup Limited Centennial, Colorado

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CLIENT	La1	arg	e No	orth An	merica	i	BOREHOLE LOG Z
PROJEC	CT NO.		-05	38			BH NO PAGE OF
NORT	°H				1	DRILLE	ER DRILLING ENGINEERS INC. DATE START 4/18/2007
EAST	· · · · · · · ·				1	RIG	CME 75 DATE FINISH 4/18/2007
GRD	ELEV	1 			1	BITS 8	.25"H.S.A. FLUIDS - TOTAL DEPTH 30.3'
TOC	ELEV.				1	LOGGE	ED BY Charoen S. WATER DEPTH 14'
SAMF TCT C SS S DC D Othe	PLE TY Utting plit Sp Dry Con r:	PES: s poon re	}	WS Wash NX NX C CS Contir	ore Juous Sar	npler	SAMPLER SPECIFICATIONS: Length 2.5' O.D. 2" I.D. .7" Other
UEPTH		SAMP NO	SAMP	RECOV.	BLOWS	SYM	SURFACE CONDITION: Grass Soil VAPOR
	CUDING			F1/F1	per o		SOIL/ROCK DESCRIPTION BC HS Core
20							
	·				12		up to 2-Inch diameter, trace
E-ZI					50/3*		silt, trace day WET.
							ZO.S' tO ZI.O' NO RECOVERY
÷-22							Augered to 24
<u>ulu</u>	- 8.25						21.0' TO 24.0' - Cutting SAND AND
E-23							GRAVEL Brownto redbrown
1111							some slones up to 2-inch
E ²⁴	4.25			17	22		SC E ZALLARDI
Enc	1.D.			22	35		24 0'to 258' SAND AND CROVEN
				74	40		Brown to redbrown very dence
E-26				04	31		some stones up to 2-inch
							diameter WET
E-2.7							25.8' to 26.0' NO RECOVERY
							Augered to 29'
E-25							26.0 to 28.0 - Cutting - SAND AND
							GRAVEL, Brown to redbrown,
F3J				107	15		Some slones up to 2-inch diameter
1111				15"	40		28.0 10 24.0' - Cutting SILTSTONE
F- 50		<u>├</u>	1	<u> </u>			Diomy, little sand Trace clay. WET
							50 0 29 10 30.3
LOCA	<u>110N S</u>	KETCI	Н		GR	ANUL	DENSITY: PROPORTIONS: REMARKS/WEATHER
	See Plan 10-30 30-50						Loose 0-4 Soft 0-10% Trace 60 F
							Dense 4-B Med Stiff 10-20% Little Dense 8-15 Stiff 20-35% Some C
L			<u> </u>		>50	Very	Dense 15-30 Very Stiff 35-50% And DUVWY

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CLIENT PROJEC	Lat T LOC	arg	e No	orth Annasor	<u>merica</u>	z	BOREHOLE LOG 2
PROJEC	T NO.	LF	-05	38			PAGE OF
NORT	H					DRILL	ER DRILLING ENGINEERS INC. DATE START 4/18/2007
EAST			·			RIG	CME 75 DATE FINISH 4/18/2007
GRD	ELEV.	•				BITS 8	3.25"H.S.A. FLUIDS - TOTAL DEPTH 30.3'
TOC	ELEV					LOGGI	ED BY Charoen S. WATER DEPTH 14'
SAMP CT C SS S DC D Other	SAMPLE TYPES: CT Cuttings WS Wash SS Split Spoon NX NX Core DC Dry Core CS Continuous Sample Other:						SAMPLER SPECIFICATIONS: Length 2.5' Material Stee! O.D. 2" Liner I.D. 1.7" Other
DEPTH (FT)	BIT CASING	SAMP NO.	SAMP TYPE	RECOV. FT/FT	BLOWS per 6"	SYM	SURFACE CONDITION: Grass SOIL VAPOR SOIL/ROCK DESCRIPTION
-30					50/31		29 0 to 30 2 OUTCTONE D.
E 21				END	DE BAR	EHO	F Very stiff little cloumburger
					P. 001	E III	trace sandi Slightly weathered
h.							Very moist.
ىلىپ	0.04		1		ļ		
ىلى	8.25						Filter sand to 29.0
ىىلىر	H.S.A						Augered to 29.5'
سلس	1. 75						Install monitoring well MW-2
n lu	1.D						2° PVC 10-tot screen .
سيات							
<u>i uu</u>							Capina LOCIL
يسل							Riser = 3 to 192' Contrate oto 2
h							Screen 19.2' to 29.2' Bentonile chip 2 to H
							Cap 29.2'-29.5' Filler Sand 17 to 29.5'
uulu							
<u>ulu</u>							
سلي							Bentonite 6 bags
uulu							Sand 4 bags
			1		<u> </u>	+	- uncreile i bag
					<u> </u>		
LUCA	G					RANUL	DENSITY: PROPORTIONS: REMARKS/WEATHER
2	Sec \$1000 10-10					Nød	Loose 0-4 Soft 0-10% Trace
	30-60					Verv	Dense 8-15 Stiff 20-357 Some 70F SUMMY
{ <u></u>							And Control of the second seco
LOC :	STATUS	S [.]					/

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PHOLET DUCTION LINE CONTON: Date finish Andy 4 Richard PHOLET NO. 5 INDRIFT DRILLER DRILLING ENGINEERS INC. DATE START 4/8/2007 INDR DRILLER DRILLING ENGINEERS INC. DATE START 4/8/2007 INDR DRILLER DRILLING ENGINEERS INC. DATE START 4/8/2007 INDR BITS 8,25 'H.S.A. FULIDIS TOTAL DEPTH 3/ INDR DOC DEV DOCOGED BY CHATORN Material Steel INDR SAMPLE TYPES SAMPLER SPECIFICATIONS: Material Steel IND SAMPLER SPECIFICATIONS: Material Steel DOC DEV OTHER SAMPLER SPECIFICATIONS: Material Steel DOC DEV OTHER SAMPLER SPECIFICATIONS: Material Steel DOC DEV OTHER SAMP SAMP RECOV BLOWS SYM SURFACE CONDITION: Grass OTHER SAMP SAMP RECOV BLOWS SYM SURFACE CONDITION: Grass SOUL WORK OTHER SAMP SAMP RECOV BLOWS SYM SURFACE CONDITION: Grass SOUL WORK OTHER STAP SAMP SAMP RECOV BLOWS SYM SOUL/ROCK DESCRIPTION SOUL WORK OTHER <th>CLIEN</th> <th>T La</th> <th>far</th> <th>geN</th> <th>orth A</th> <th>meric</th> <th>a</th> <th>BOREHOLE LOG</th> <th>7</th>	CLIEN	T La	far	geN	orth A	meric	a	BOREHOLE LOG	7	
NORTH DRILLER DRILLING ENGINEERS INC DATE START 4/8/2007 LASE RIG CME - 75 DATE FINISH 4/8/2007 GRD ELEV BITS 8,25 TH,5.4. FLUIDS TOTAL DEPTH 31 TOC ELEV LOCGED BY Chargen S. WATER DEPTH 4/ SAMPLER SECUTIONS MATER DEPTH 4/ DUTH DI 1.37 Other DI 1.37 DUTT Continuous Sampler DI 1.37 Other DUTT Continuous Sampler DI 1.37 Other DUTT Continuous Sampler DI 1.47 Other DI 1.37 Other DI 1.47 Other	PROJ	ECT LO		F-05	indsor 538	,		Andy & Richard	BH NO	
LAST NIC CME = 75 DATE FINISH 4/8/2007 CHD ELEV BITS 8.25 'H.S.A. FLUIDS DATE FINISH 4/8/2007 TOC ELEV DATE FINISH 4/8/2007 SAMPLE REPORT S. WATER DEPTH 31' TOC ELEV LOCGED BY CHARDEN S. SAMPLE REPORT SAMPLER SPECIFICATIONS: DE DRY CORE CS Continuous Sampler DTO: CS Continuous Sampler DITY CORE CS Continuous Sampler DITY CARDEN NO TYPE TYPES SAMPLE RECOV BLOWS SYM SAMP RECOV BLOWS CHTYPE RATION SUPPACE CONDITION: CHTYPE RATION SOULAROCK DESCRIPTION DE TYPE CORE SUPPACE CONDITION: CHTYPE RATION BUT AND CLAY SAMPLE RECOV BLOWS SYM SAMP RECOV SUPPACE CONDITION: CHTYPE RATION SUPPACE CONDITION: SAMPLE RATION SUPPACE CONDITION: SAMPLE RATION S	NOR	TH					DRILL	ER DRILLING ENGINEEDS INC		
CALE MISS 476,27007DATE DEPTH 317TOTAL DEPTH 317TOTAL DEPTH 317TOTAL DEPTH 317SAMPLE TYPES.SAMPLE TYPES.SAMPLE TYPES.SAMPLE SAMP SAMPSAMPLE TYPES.SAMPLE SAMP SAMPSAMPLE SAMP SAMPPOUNTDIT SAMP SAMPRECOVBLOWSSYMSURFACE CONDITION: GrassJob 1.37"Material SteelOUNTOUNTCOLSPANDDIL ROCK DESCRIPTIONBE PRICEOUNTOUNTCOLSPANDSAMP SAMPRECOVBLOWSSYMSURFACE CONDITION: GrassJob 1.47OUNTOUNTOUNTSAMPLER SPECIFICATIONS:LagrJob 2.47SURFACE CONDITION: GrassJOB 1.47OUNTOUNTOUNTSAMPLER SPECIFICATIONS:GrassSULTAND CLAYSULTAND CLAYSULTAND CLAY <th cols<="" td=""><td>E EAS</td><td>Ť</td><td></td><td></td><td></td><td></td><td>RIG</td><td>CME-75</td><td>DATE START 4/18/2007</td></th>	<td>E EAS</td> <td>Ť</td> <td></td> <td></td> <td></td> <td></td> <td>RIG</td> <td>CME-75</td> <td>DATE START 4/18/2007</td>	E EAS	Ť					RIG	CME-75	DATE START 4/18/2007
IDAGED BY Chargen S. MATER DEPTH 4' SAMPLER YPES SAMPLER SPECIFICATIONS: Largth 277 Material Steel OD LAT SAMPLER SPECIFICATIONS: Largth 277 DEPTH BIT SAMP SAMP RECOV. BULWS SAMP SAMP RECOV. DITT CASIRE NO TYPE PT/PT Per 6' OTH Colspan="2">Solutions Sampler Other OTH Colspan= 2 Solutions Sampler OTH Colspan= 2 Solution Sampler OTH Colspan= 2 Solution Sampler OTH Colspan= 2 S	GRD	ELEV					BITS	3.25" H.S.A. FLUIDS	TOTAL DEPTH 31	
SAMPLE TYPES: SAMPLE TYPES: SAMPLES SAMPLES SAMPLER SPECIFICATIONS: Length Z, S Material Steel OTHER	TOC	ELEV					LOGGI	D By Charoen S.	WATER DEPTH 41	
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	SAM	PLE TY	PES:					SAMPLER SPECIFICATIONS:		
Inter ID	S	Split S	s poon	J	WS Wash NX NX C	ore		Length <u>2.5</u> 0.D. <u>2</u>	Material Sleel	
DEPTH BIT SAMP SAMP RECOV BLOWS SURFACE CONDITION. Grass SOL WADDE (FT) CASING NO TYPE PT/FT PE BLOWS SURFACE CONDITION. Grass SOL WADDE (FT) CASING NO TYPE PT/FT PE BLOWS SURFACE CONDITION. Grass SOL WADDE (FT) CASING NO TYPE PT/FT PE BLOWS SURFACE CONDITION. Grass SOL WADDE (FT) CASING NO TYPE PT/FT PE BLOWS SURFACE CONDITION. Grass SOL PDC	a oth	er	re		CS Contir	iuous Sa	mpler	I.D. <u>1.7</u>	Other	
(FT): CARNE NO TYPE PT/PT per 6" SYM SOIL/ROCK DESCRIPTION PDD TDD SOIL/ROCK DESCRIPTION PDD TDD POD TOD SOIL/ROCK DESCRIPTION PDD TDD POD TOD Augered to 4' Image: Soil And Clay 1 O to 4.0' - Cutting - SILT AND CLAY Image: Soil And Clay 2 Brown, little Sand, little gravel Image: Soil And Clay 3 H.S.A Image: Soil And Clay Image: Soil And Clay 4 SS 1 4'to 6' Image: Soil And Clay Image: Soil And Clay 5 4.25" SS 24" Some sith, some clay, Wet Image: Some soil And Clay 6 Image: Soil And Clay Image: Some soil And Clay Image: Some soil And Clay Image: Some some some some clay, Wet 7 Image: Some soil And Clay Image: Some some some some some clay, Wet Image: Some some some some some some some some clay, Wet 8 Image: Some some some some some some some some clay, Some clay, Wet Image: Some some some some clay, Wet Image: Some some some some some some some some s	DEPTI	н віт	SAMI	PISAMP	RECOV	BLOWS		SURFACE CONDITION (Trass	SOIL VAPOR	
-0 Augered to 4' -1 0 to 4.0' - Cutting - SILT AND CLAY -2 Brown, little Sand, little gravel -3 H.S.A -4 SS 1 4'to 6' -5 4.25" -5 S.S -7 J.D. -6 -7 -7 S.S -8 -7 -7 S.S -8 -7 -9 S.S -9 -7 -9 -7 -9 -7 -9 -7 -9 -7 -9 -7 -9 -7 -9 -7 -9 -7 -9 -7 -10 -7 -10 -7 -10 -10 -10 -10 -10 -10 -10 -10 -10 -10 -10 -10 -10 -10 -10 -10 -10 -10	(FT)	CASING	NO	TYPE	FT/FT	per 6"	SYM	SOIL/ROCK DESCRIP		
0 Augered to 4' 0 to 4.0' - Cutting - SILT AND CLAY Brown, little Sand, little gravel 1 trace roots, Moist. 2 8.25 3 HSA 4 SS1 4'to 6' 5 4.25" 1.D. Z4' 3 6 Augered to 9' 6 Augered to 9' 6.0'to 7.0' - Cutting - FINE SAND. Brown somestilt, someclay, wet 7.0'to 9.0' - Cutting - SILT AND CLAY Brown, trace cand, moist 5 S2 9'to 10' 8 10''to 9.0' - Cutting - SILT AND CLAY Brown, dense, some clones up 7.0'to 9.0' - Cutting - SILT AND CLAY Brown, trace cand, moist S2 9'to 10.3' - FINE TO MEDIUM SAND 8 10''to 10.3' - FINE TO MEDIUM SAND 9 CHANULAR 0-10 COMEDIVE	STEAL AND								BG HS Core	
1 Image red to 4' 0 to 4.0' 0 to 4.0' Brown, little sand, little gravel trace roots, Moist 3 HSA 4 SS 1 4 SS 1 5 4.25' 5 18'' 2 4.0 to 5.5' FINE SAND, Brown loose, 5 1.0'' 24'' 3 5 24'' 4 5.5' to 6.0'' 6 10'' 6 0''o' 7.0'' 7 6.0' to 7.0' - Cutting - FINE SAND, Brown somestilt, some clay, wet 10'' 7.0'to 9.0' - Cutting - SILT AND CLAY 8 9.0''to 10.3' - FINE to MOIST 8 24''' 9 12 8 9.0'to 10.3' - FINE to MEDIUM SAND 10 25'' 10 12 8 24''' 9.0'to 10.3' - FINE to MEDIUM SAND 10 12 8 12 8 12 9.0'to 10.3' - FINE to MEDIUM SAND	FO						+			
1 0 1								nugered 10 2		
$\begin{array}{c ccc} \hline & & & & & & & & & & & & & & & & & & $								Brown little to 1	ITHIN AND CLAY	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	1							trace roots Maint	t graves	
3 H.S.A -4 SS 1 4'to 6' -5 H.S.A -4 SS 1 4'to 6' -5 H.S.A -5 H.S.A -5 J.D. SS -7 Z4 3 -7 Augered to 9' -7 Augered to 9' -7 G.o'to 7.0' - Cutting - FINE SAND. Brown -7 Somesilt, someclay, wet. -7 Somesilt, someclay, wet. -7 Somesilt, someclay, wet. -7 G.o'to 7.0' - Cutting - SILT AND CLAY -7 Brown, trace sand. moist. -8 SS 16" G.o'to 10.3' - FINE TO MEDIUM SAND -10 SS 16" G.o'to 10.3' - FINE TO MEDIUM SAND -10 SS 16" G.o'to 10.3' - FINE TO MEDIUM SAND -10 SS 24" 12 Brown, deuse, some ctones up -10 CRANULAR COHESIVE -10 CRANULAR COHESIVE -10 CRANULAR O-100 -10 CRANULAR COHESIVE -10 CRANULAR Sonto coar sont o-100 </td <td>4</td> <td>0 25</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	4	0 25								
H.S.A SS 1 4'to 6' SS 1 5'to 6' SS 24' 3 SS 24' 3 CPurged water) 4 SS' to 6.0' NO RECOVERY. Augered to 9' 4 Somesilt, someclay, wet 3 Somesilt, someclay, wet 3 Recovery 8 SS 24' 12 Brown, trace sond, moist 11' SS 24' 12 Brown, dense, some ctones up 1 to 2-inch diametes, Damp 1 LOCATION SKETCH CRANULAR COHESIVE: See Plom CRANULAR CH Set 10-107 Sovery Dense 15-30 Very Statt 35-507 Sovery Dense 15-30 Very Statt 35-507	E-3	0.00								
-4 SS 1 4'to 6' -5 4.25" 1.D. SS 24" 24" 3 CPurged water) -6 7 -6 7 -7 7		H.S.A								
4.25" SS 18" 2 4.0 to 5.5' FINE SAND. Brown loose, 5 1.D. 24" 3 Some sitt, some clay. Wet 6 4 5.5' to 6.0' NO RECOVERY. 7 4 5.5' to 6.0' NO RECOVERY. 8 6.0' to 7.0' - Cutting - FINE SAND. Brown 3 8 7.0' to 9.0' - Cutting - SILT AND CLAY 8 7.0' to 9.0' - Cutting - SILT AND CLAY 8 8 8 9 SS 16" 9 SS 16" 9 9.0' to 10.3' - FINE TO MEDIUM SAND 10 12 Brown, dense, some ctones up 10 12 Brown, dense, some ctones up 10 10-30 Med Dense 1-3 9 10-30 Med Dense 0-4 9 10-30 Med Suff 10-20X 10-30 Wery Dense 13-30 Very Suff 3-50X 9 9-50 9 9 10-30 Wery Dense 13-30 9 10-30 Med Suff 10-20X 9 10-30 Wery Dense 13-30 9 9	-4	•4						SS1 4'to (5'	
Some sitt, some clay. Wet I.D. 24 3 CPurged water) Solution of the solution		18 2						4.0 to 5.5' FINE SAND, B	rown, loose,	
100 100 <td>÷5</td> <td>H.25</td> <td></td> <td>SS</td> <td>2.</td> <td>3</td> <td></td> <td><u>some sitt</u>, some cla</td> <td>y. Wet</td>	÷5	H.25		SS	2.	3		<u>some sitt</u> , some cla	y. Wet	
-6 -7 D.S. 106.0° NO RECOVERY. -7 Augered to 9' -7 6.0'to 7.0' - Cutting - FINE SAND. Brown -8 -7.0'to 9.0' - Cutting - SILT AND CLAY -8 -7.0'to 9.0' - Cutting - SILT AND CLAY Brown, trace sand. moist. -10 SS 16" -10 -10 SKETCH -10 See Plan -10 CRANULAR: COHESIVE: 0-10 Lase 0-4 -10 Some for the sum of the s		1.0.			24	3 4		(Purged water)		
Aborered To Y Aborered To Y 6.0 to 7.0' - Cutting - FINE SAND Brown Somessilt, someclay, wet. 7.0'to 9.0' - Cutting - SILT AND CLAY Brown, trace sand. moist 9 SS 16" 6.0 to 7.0' - Cutting - SILT AND CLAY Brown, trace sand. moist SS 16" 6.0 to 7.0' - Cutting - SILT AND CLAY Brown, trace sand. moist SS 16" 6.0 to 7.0' - Cutting - SILT AND CLAY Brown, trace sand. moist SS 16" 6 9.0 to 10.3' - FINE TO MEDIUM SAND 10 SS 12 Brown, dense, some stones up to 2-inch diameter. Damp LOCATION SKETCH DENSITY: PROPORTIONS: REMARKS/WEATHER CRANULAR: COHESIVE: 0-10 10-30 10-30 Med Dense 30-50 Dense 30-50 See Yery Dense </td <td>6</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>5.5 106.0' NO RECOVE</td> <td>RY</td>	6							5.5 106.0' NO RECOVE	RY	
10 10 <td< td=""><td>E n</td><td></td><td></td><td></td><td></td><td></td><td></td><td>Augered to 4.</td><td>E CAND DI</td></td<>	E n							Augered to 4.	E CAND DI	
-8 7.0'to 9.0' - Cutting - SILT AND CLAY -9 Brown, trace sand, moist -9 SS 16" -10 SS 16" -10 SS 2 -10								somesilt somecto	what	
Brown, trace sand moist SS 2 9' to 11' SS 16" 6 9.0'to 10.3' - FINE TO MEDIUM SAND Brown, dense, some ctones up to 2-inch diameter. Damp LOCATION SKETCH DENSITY: PROPORTIONS: REMARKS/WEATHER CRANULAR: COHESIVE: 0-10 Lose 0-4 Soft 0-102 Trace 10-30 Med Dense 4-8 Med sutt 10-202 Little 30-50 Dense 8-15 Sutt 20-352 Some >50 Very Dense 15-30 Very Sutf 35-502 And	ĒΑ							7.0' to 9.0 - Cutting - SI	TANDCLAY	
SS 16" 6 9.0'to 10.3' - FINE TO MEDIUM SAND FINE SS 24" 12 Brown, dense, some stones up Brown, dense, some stones up to 2-inch diameter. Damp LOCATION SKETCH DENSITY: PROPORTIONS: REMARKS/WEATHER See Plom 0-10 Locae 0-4 Soft Soft 0-107 Trace 70 F. SUNNY Soft 0-50 Dense 8-15 Stiff Soft 0-307 Very Dense 35-507 And	, 	о 						Brown trace sand	moist	
EIO SS 16" 6 24" 12 Brown dense, some ctones up to 2-inch diameter. Damp LOCATION SKETCH DENSITY: PROPORTIONS: REMARKS/WEATHER CRANULAR: COHESIVE: 0-10 Losse 0-4 Soft 0-10% Trace 10-30 Med Dense 4-B Med Stiff 10-20% Little 30-50 Dense 8-15 Stiff 20-35% Some >50 Very Dense 15-30 Very Stiff 35-50% And	E-9	9						SS 2 9' to 1		
E-10 LOCATION SKETCH LOCATION SKETCH See Plan See Plan LOCATION SKETCH LOCATION SKETCH LOCATION SKETCH LOCATION SKETCH DENSITY: DENSITY: DENSITY: CRANULAR: O-10 Loose 0-4 Soft 0-10 Loose 0-4 Soft 0-102 DENSITY: DE				SS	16"	6		9.0'to 10.3' - FINE TO M	EDIUM SAND	
LOCATION SKETCH DENSITY: PROPORTIONS: REMARKS/WEATHER CRANULAR: COHESIVE: 0-10 Losse 0-4 Soft 0-10% Trace 10-30 Med Dense 4-8 Med Stiff 10-20% Little 30-50 Dense 8-15 Stiff 20-35% Some >50 Very Dense 15-30 Very Stiff 35-50% And	E 10				24	12	<u> </u>]	Brown, dense, son	ne ctones up	
LOCATION SKETCH DENSITY: PROPORTIONS: REMARKS/WEATHER GRANULAR: COHESIVE: 0-10 Loose 0-4 Soft 0-107 Trace 10-30 Med Dense 4-8 Med Stiff 10-20% Little 30-50 Dense 8-15 Stiff 20-35% Some >50 Very Dense 15-30 Very Stiff 35-50% And	L							to 2-inch diamete	r. Damo	
See Plan See Plan See Very Dense 15-30 Very Stiff 35-502 And CHANULAR: COHESIVE: 0-10 Loose 0-4 Soft 0-107 Trace 10-30 Med Dense 4-8 Med Stiff 10-20% Little 30-50 Dense 8-15 Stiff 20-35% Some 35-50% And TOF SUMMY	LOCA	LOCATION SKETCH						DENSITY: PROPORTIONS	REMARKS/WEATHER	
See Flown 10-30 Med Dense 4-B Med Stiff 10-20% Little 30-50 Dense 8-15 Stiff 20-35% Some >50 Very Dense 15-30 Very Stiff 35-50% And	e e		01-			GR 0-10	ANULA	K: COHESIVE: Loose 0-4 Soft 0-10% Trace		
>50 Very Dense 15-30 Very Stiff 35-50% And		See Plon 10-30 30-50					Med I	Dense 4-8 Med Stiff 10-20% Little	707 Sunny	
	L	>50					Very 1	Dense 15-30 Very Stiff 35-50% And	/	

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CLIENT Latarge North America PROJECT LOCATION Windows 22

BOREHOLE LOG

PROJE	CT NO		-0	538			BH NO	
NOR	гн				T	DRILL	PAGE OF	4
EAST						RIG	CMF 75	8/2007
GRD	ELEV.					BITS	DATE FINISH 4/	5/2007
TOC	ELEV.					LOGG	ED BY Charpon S	· / · · ·
SAMI	LE TY	PES:					SAMPLER SPECIFICATIONS	
E CT C SS S DC I Othe	ulting plit S Dry Co r	s poon re	, ,	WS Wash NX NX C CS Contir	ore nuous Sa	mpler	Length Z.5' Material Steel 0.D. 2" Liner	
DEPTH	BIT	SAMP NO.	SAMP TYPE	RECOV. FT/FT	BLOWS per 6"	SYM	SURFACE CONDITION: Grass	DIL VAPOR
				-		1	SUIL/ROCK DESCRIPTION BC	HS Core
					20 25		10.3' to 11.0' NO RECOVERY	
-12					-		Augered to 14' 11.0' to 14.0' - Cutting - SAND AND GRAV	5/_
ulu.	."						Brown, Damp.	
E-13	8.25					1		+
	H.S.A							
E14	4.25″				6		SS 3 14' to 16'	
	1.D.			16	6		14.0' TO 15.3' SAND AND GRAVEL .	
					8		Red brown, med dense trace	
E16				24	7		153' to 16 0' NO PECENDOV	+
							Allaerad to 10/	
-17							16'o to 19 0 - Cutting , CAND AND	
- 11							GRAVEL trace sitt what	
E-18								
ulu								+-+
F-10				194	0	<u> </u>	SS 4 19' to 21'	
				7/1	<i>3</i> 0		19.0 to 20.5 SAND AND GRAVEL.	
- /0				24		<u> </u>	Brown, dense, Some stones up to	
							2- inch diameter, trace silt. Wet	
LUCA	ION S	KETCH			4 0	ANITA	DENSITY: PROPORTIONS: REMARKS/WEATHER	
S	ee i	>1 <i>c</i> m	^		0-10 10-30 30-80 >50	Med 1 I Very I	Loose 0-4 Soft 0-107 Trace Dense 4-8 Med Stiff 10-207 Little Dense 6-15 Stiff 20-357 Some Dense 15-30 Very Stiff 35-507 And	

LOC STATUS:

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CLIENT	Lat	arg	e No	orth Av	<u>merica</u>	a	BOREHOLE LOG 3
PROJEC	T NO.	LF	-05	38			PAGE _3OF
NORT	н					DRILLI	ER DRILLING ENGINEERS INC. DATE START 4/18/2007
EAST						RIG	CME 75 DATE FINISH 4/18/2007
GRD	ELEV			•		BITS 8	3.25"H.S.A. FLUIDS - TOTAL DEPTH 31'
тос	ELEV					LOGGI	ED BY Charoen S. WATER DEPTH 14'
SAMI CT C SS S DC L Othe	SAMPLE TYPES: CT Cuttings WS Wash SS Split Spoon NX NX Core DC Dry Core CS Continuous Other:						SAMPLER SPECIFICATIONS:
UEPTH	BIT CASING	SAMF NO.	SAMP TYPE	RECOV. FT/FT	BLOWS per 6"	SYM	SURFACE CONDITION: Grass SOIL VAPOR SOIL/ROCK DESCRIPTION BC HS
120					50/s"		20.5' to 21.0' NO RECOVERY.
モン						1	Augered to 24'
12.77							21.0' to 24.0' - Cutting - SAND AND
E E	4						GRAVEL Brown some
E-23	8.25						stones up to 2-inch diameter
- Luu	H.S.A						trace silf.
E-24	-24 / 25'						855 24' to 26'
т. Т	T 4.25 4 Z						24.0'to 25.7' SAND AND GRAVEL.
E-25	1.0	.D. 20 3					Brown, very dense, some
بىلىر				24"	30		stones up to 2-inch diameter
-26							Trace silt.
ىيلىر							25.7 TO 26.0 NO RECOVER 1
E-27							Augereel 1029
iline o							GRAVEL competing to
E20							2-inch diameter trace silt
E 20						1	SS 6 29' to 31'
			124 6				29.0 to 30' SILTSTONE Grey
E-30	>			1/24	12		very stiff some clay trace
							sand. Lightly weathered wet
LOC	LOCATION SKETCH						DENSITY: PROPORTIONS REMARKS / WEATHER
	G 0-10 See Plan 30-60 >50					RANU Me Yer	JLAR: COHESIVE: COHESIVE: Loose 0-4 Soft 0-10% Trace pd Dense 4-8 Med Stiff 10-20% Little FOF SUMMY Dense 8-15 Stiff 20-35% Some FO F SUMMY ry Dense 15-30 Very Stiff 35-50% And F SUMMY
LOC	STATU	JS					

PRELIMINARY._____ FINAL: ____

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client Projec	Lat T LOC	ara ATION	e No	orth Anna disor	<u>co</u>	a	BOREHOLE LOG	
PROJEC	T NO.		-05	38			PAGE OF	4.
NORTI	H		•	•^		DRILLE	ER DRILLING ENGINEERS INC. DATE START 4/	18/2007
EAST						RIG	CME 75 DATE FINISH 4/	18/2007
GRD	ELEV.					BITSS	2.25"H.S.A. FLUIDS TOTAL DEPTH	31'
TOC	ELEV.					LOGGE	ed by Charoen S. Water Depth	14
SAMPLE TYPES: CT Cuttings WS Wash SS Split Spoon NX NX Core DC Dry Core CS Continuous Sampler Other:						mpler	SAMPLER SPECIFICATIONS: Length 2.5' 0.D. 2" I.D. 1.7" Other	<u> </u>
DEPTH	BIT Casing	SAMP NO.	SAMP TYPE	RECOV. FT/FT	BLOWS per 6"	SYM	SURFACE CONDITION:GTASS	SOIL VAPOR PID FID BG HS Core
0.0414								
130 1-30					26 30		30.0' to 31.0' NO RECOVERY	
ىكى مەلىپىلىدىلىدىلىدىلىيىلىيەلىيەلىيەلىيەلىيەلىيەلىيەلىيەلىي	8.25 H.S.A 4.25 I.D.		EN	DOF	BOREH	OLE	Augered to 31 FND OF BOREHOUE Monitoring Well Installation 2' PVC 10-foot screen MW-3 Casing + lock Cap riser -3 to 20.7' Concrete 0 + Screen 20.7' to 30.7' Bentonite chip 4' Cap 30.7' to 31.0' Filter sond 18.5' to Sand 3 bags Bentonite chip 6.5 bags Concrete 2 bags	
					<u> </u>			
	See.	PI	олл		G 0~10 10-30 30-50 >50	RANUL Mod Very	DENSITY: PROPORTIONS: REMARKS/WEATHE LAR: COHESIVE: Loose 0-4 Soft 0-10% Trace Ponse 4-B Med Stiff 10-20% Little Dense 8-15 Stiff 20-35% Some Dense 15-30 Very Stiff 35-50% And	NWY
loc Prel	STATU IMINAF	S [.] RY				FINAL:		noup Limiter Ial, Colonado



CLIEN	Lat	arg.	e No	orth Au	meric	a	BOREHOLE LOG	4	
PROJE	CT LOC CT NO.	ATION LF	<u>Win</u> -05	ndsor, 38	<u> </u>		Andy & Richard	BH NO OF	2
NOR1	r1.1			·····		DRILLE	B DRILLING ENGINEERS INC.	DATE START 4	/18/2007
EAST	····					RIG	CME-75	DATE FINISH 4/	18/2007
GRD	ELEV.					BITS 8	25" H.S.A. FLUIDS	TOTAL DEPTH 13	3.71
тос	ELEV.				ĺ	LOGGE	D BY Charoen S.	WATER DEPTH	4′
SAMI CT C DC D Othe	PLE TY Cutting Split Sj Dry Co er:	PES: s poon re	Y N (YS Wash NX NX C CS Contir	ore Nuous Se	ampler	SAMPLER SPECIFICATIONS: Length 2.5 0.0 27 I.D. 1.7	Material <u>steel</u> Liner Other	
DEPTI	EPTH BIT SAMP SAMP RECOV. BLOWS (FT.) CASING NO. TYPE FT/FT per 6						SURFACE CONDITION: Grass		SOIL VAPOR. PID FID
국 (FT.) 		NO.	TYPE	FT/FT	per 6		SOIL/ROCK DESCRIP	TION	BG HS Core
0 1 2 3 4 5 6 7 8 7	8.25 H.S.A 4.25 I.D.			$\frac{10^4}{24''}$	6121212		Augered to 4' 0 to 4.0' - cutting - S Brown, trace sand Moist 4.0' to 4.8' GRAVEL. dense, trace sand trace clay. Wet 4.8' to 6.0' NO RECO Augered to 4 6.0' to 9.0' GRAVEL. Sand. Some stone diameter trace Silt Wet. SS 2 9' t 9.0' to 11.0' SAND AND to mill downe	ILT AND CLAY , Trace roots , Trace roots Brown, med , Trace silt, VERY 7' Brown, some up to 2-inch trace clay. To 11' DGRAVEL. Bro	
F-10				+			is reasonable, acrise	, 110(x >11]	
	LOCATION SKETCH See Plan 10-30 30-5 >50						DENSITY: PROPORTIONS: AR: COHESIVE: Loose 0-4 Soft 0-10% Trace Dense 4-8 Med Stiff 10-20% Little Dense 8-15 Stiff 20-35% Dense 15-30 Very Stiff 35-50% And	70 F Sum	R

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LOG STATUS:

PRELIMINARY: ______ FINAL: _____

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CLIENT Latarge North America

BOREHOLE LOG

BH NO. $E = -0538$ PAGE TWO LEF -0538 SAMPLE TYPES COLD TWO LEF -0538 SAMPLE TYPES Colspan= 2" Colspan= 2" OUTO TYPE FT/FT PE FT	CLIENT				orin A	meric	ca	BOREHOLE LOG 4	
NORTHDRILLER DRILLING ENGINEERS INC. DATE START 4/18/2007EASTRIGCME 75DATE FINISH 4/18/2007CRD ELEVBITS 8.25"H.S.A. PLUIDSTOTAL DEPTH 13.7"TOC ELEVLOGGED BY Chargen S.WATER DEPTH 4'SAMPLE TYPES: CT. Cuttings OtherWS Wash NX NX Core SCONDINUOUS SamplerSAMPLE SPECIFICATIONS: LOT 1.2"Material Steel Long 1.2"OKEPTH BIT SAMP SAMP RECOV OtherNS Wash NX NX Core SCONDINUOUS SamplerSURFACE CONDITION: SOIL/ROCK DESCRIPTIONMaterial Steel LinerINNX NX Core SOIL/ROCK DESCRIPTIONSOIL WAPPA Proprint 1.1"Soil WAPPA Proprint 1.1"INSAMP SAMP RECOV SOIL/ROCK DESCRIPTIONBLOWS Proprint 1.1"INISSITMSURFACE CONDITION: SOIL/ROCK DESCRIPTIONINISISINISISINISSOIL WAPPA Proprint 1.1"INISISINISISINISISINISISINISISINISISINISISINISISINISISINISISINISISINISISINISISINISISINISISINISISINISISINISISINISISINIS<	PROJEC	OT NO.	<u>LE</u>	-05	1050r 38			BH NO PAGE OF 2	
EAST RIG CME 75 DATE FINISH 4/18/2007 GRD ELEV BITS 8.25"H.S.A. FLUIDS - TOTAL DEPTH 13.7" TOCELEV LOGGED BY Chargen S. WATER DEPTH 4" SAMPLE TYPES GT GUTINGS WS WASH GS Spoin Spon NX NX Core Gther. CS Continuous Sampler Other. CS Continuous Sampler ID. LS CONTROL CS CONDITION: CG CS CONDITION: CG CS CONDITION CS	NORT	н	•				DRILL	ER DRILLING ENGINEERS INC. DATE START 4/18/2007	
CRD ELEVDITS 8.25" H.S. A. FLUIDS -TOTAL DEPTH 13.7'TOTAL DEPTH 4'SAMPLER SPECIFICATIONS:Length 2.5Material SteelCOLSTINGDEPTH 13.7'WATER DEPTH 4'SAMPLER SPECIFICATIONS:Length 2.5Material SteelID 1.3"DEPTH 13.7'Material SteelOtherOtherColspan="2">SAMPLER SPECIFICATIONS:Langth 2.5Material SteelOtherOtherOtherOtherOtherID 1.3"SAMPLER SPECIFICATIONS:Langth 2.5Material SteelOtherID 1.3"SAMPLER SPECIFICATIONS:Langth 2.5ID 1.3"SAMPLER SPECIFICATION:Colspan="2">Material SteelID 1.5ISISIS <th col<="" td=""><td>EAST</td><td></td><td></td><td></td><td></td><td></td><td>RIG</td><td>CME 75 DATE FINISH 4/18/2007</td></th>	<td>EAST</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>RIG</td> <td>CME 75 DATE FINISH 4/18/2007</td>	EAST						RIG	CME 75 DATE FINISH 4/18/2007
TOC ELEVLOGGED BY Charoen S.WATER DEPTH 4'SAMPLE TYPES: CT Cuttings By Byt Spon Dry Core OtherSAMPLE TYPES: CS Continuous SamplerSAMPLER SPECIFICATIONS: Length 2.3Material Steel LinerDDPT Core OtherCS Continuous SamplerSURPACE CONDITION:CarassSout WARDE TOL DEPTHDEPTH BIT CASING NO (PT) CASING NO TYPE FT/FT PET FT/FT PET 6"SURPACE CONDITION:CarassSout WARDE TOL DEPTH1018SURPACE CONDITION:CarassSout WARDE TOL DEPTH1018SURPACE CONDITION:CarassSout WARDE TOL DEPTH1018SURPACE CONDITION:CarassSout WARDE TOL DEPTH1018SurpaceSout WARDE TYPE FT/FT PET 6"SURPACE CONDITION:Carass1018Image: South CarassSout WARDE TYPE FT/FT PET 6"SURPACE CONDITION:Carass1118Image: South CarassSouth CarassSouth Carass121622SuperiorCutting - SULT. Brown121622SS312' to 14'138.257442Superior142350/1742Superior15Int2059/17Image: Superior144.25Image: South CarassSuperior15Image: South CarassImage: South CarassImage: South Carass161620South Carass </td <td>GRD</td> <td>ELEV.</td> <td></td> <td></td> <td></td> <td></td> <td>BITS 8</td> <td>.25"H.S. A. FLUIDS - TOTAL DEPTH 13.7'</td>	GRD	ELEV.					BITS 8	.25"H.S. A. FLUIDS - TOTAL DEPTH 13.7'	
SAMPLE TYPES: CUTTINGSSAMPLE TYPES: CUTTINGSSAMPLE SPECIFICATIONS: Length 2.5Material SteelSOBULTSTATURESECONDITION:STATURESTATU	тос	ELEV					LOGGI	D By Charoen S. WATER DEPTH 4'	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	SAMPLE TYPES: CT Cuttings WS Wash (SS) Split Spoon NX NX Core DC Dry Core CS Continuous Samp Other:							SAMPLER SPECIFICATIONS: Length _ Z.5' 0. D Z'' 1. D 1.7'' Other	
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	UEPTH	<u>BIT</u> CASING	SAMP NO	SAMP TYPE	RECOV. FT/FT	BLOWS per 6	SYM	SURFACE CONDITION: Grass SOIL VAPOR SOIL/ROCK DESCRIPTION BC HS	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$									
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $						18 18			
= 12 $= 13$ $= 13$ $= 25$ $= 13$ $= 13$ $= 25$ $= 14$ $= 4,25''$ $= 14$ $= 4,25''$ $= 14$ $= 4,25''$ $= 10$ $= 15$ $= 16$ $= 16$ $= 16$ $= 16$ $= 16$ $= 16$ $= 16$ $= 17$ $= 18$ $= 19$ $= 10$ $=$						 	-	Augered to 12'	
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	E-17							11.0' to 12.0' - Cutting - SILT. Brown	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$					16"	10		some sand, some gravel. Wet	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Ē13	8.25				42		\$83 12' to 14'	
-14 4.25" IND OF GORFHOLE Very stiff, trace clay. Lightly 1D. ID. ID. ID. -15 ID. ID. ID. -16 ID. ID. ID. -17 ID. ID. ID. -18 ID. ID. ID. -18 ID. ID. ID. -19 ID. ID. ID. -19 ID. ID. ID. <td>ulu</td> <td colspan="4">H.S.A. 20 50/211</td> <td>5%2"</td> <td>/</td> <td>12.0 TO 13.3' SILTSTONE. Grey</td>	ulu	H.S.A. 20 50/211				5%2"	/	12.0 TO 13.3' SILTSTONE. Grey	
ID. 1D. 13.3'to 13.7' NO RECOVERY IND OF Borehole Monitoring well Installation (4/19/2007) 2" PVC 7-toot screen Casing and lock MW-4 Cap Riser -3 to 4.7' Concrete o to 2' Screen 4.7' to 11.7' bentouite chip 2' to 4' Cap 11.7' to 12.0' Filtersand 4: oto 13.7 -20	E14	14 4.25" END OF BOREN						Very slift, trace clay. Lightly	
 IS TO TO TO NECOVERT END OF Borehole Monitoring well Installation (4/19/2007) 2" PVC 7-toot screen casing and lock MW-4 cap Riser -3 to 4.7' Concrete o to 2' screen 4.7' to 11.7' bentowite chip z' to 4' Cap 11.7' to 12.0' Filtersand 4: oto13.7 		1D.						123't- 137' NA PECDUERY	
 Monitoring well Installation (4/19/2007) 2" PWC 7-foot screen casing and lock MW-4 cap Riser -3 to 4.7' Concrete o to 2' screen 4.7' to 11.7' tentouite chip z' to 4' Cap 11.3' to 12.0' Filtersand 4.'oto 13.7 	E-15							END OF Borehole	
2" PWC 7-foot screen Casing and lock MW-4 Cap Riser -3 to 4.7' Concrete o to 2' Screen 4.7' to 11.7' bentonite chip 2' to 4' Cap 11.9' to 12.0' Filtersand 4. oto 13.7 = 20	ELL							Monitoring well Installation (4/19/2007)	
-17 -18 -18 -18 -18 -18 -18 -18 -19 -19 -19 -20 -20 -20 -20 -20 -20 -20 -20								2" PWC 7-foot screen	
-18 Riser -3 to 4.7' Concrete o to 2' -19 Screen 4.7' to 11.7' bentonite chip 2' to 4' -19 Cap 11.7' to 12.0' Filter sand 4'.oto 13.7 -20 -20	E17							casing and lock MW-4	
-18 Kiser - 3 to 4.7' Concrete o to 2' Screen 4.7 to 11.7' bentionite chip 2' to 4' Cap 11.7' to 12.0' Filter sand 4'.oto 13.7 -20	ulu.							cap	
E-19 E-20	E-18							Riser -3 to 4.7' Concrete o to 2'	
	110							Cap 11-7 to 11.7 Levismie chip 2 104	
E-20	E								
	E-20								
LOCATION SKETCH DENSITY: PROPORTIONS: REMARKS/WEATHER	LOCA	LOCATION SKETCH						DENSITY: PROPORTIONS: REMARKS/WEATHER	
See Play GRANULAR: COHESIVE: 0-10 Loose 0-4 Soft 0-10% Trace 70 F Survey 10-30 Med Dense 4-8 Med Stiff 10-20% Little 70 F Survey		See Plan 10-30						AR: COHESIVE: Loose 0-4 Soft 0-10% Trace Dense 4-8 Med Stiff 10-20% Little FOF SUMMY	
30-50 Dense B-15 Stiff 20-35% Some >50 Very Dense 15-30 Very Stiff 35-50% And						>50	Very	Dense 8-15 Stiff 20-35% Some Dense 15-30 Very Stiff 35~50% And	

LOG STATUS.

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PRELIMINARY._____ FINAL: _____

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CLIENT PROJEC PROJEC	Lat CT LOC CT NO.	arg ATION	e No -05	ndsor 38	meric Co	a	BOREHOLE LOG	~ ~ ~	1
NORT EAST GRD TOC	H ELEV ELEV.					DRILLI RIG BITS 8	ER DRILLING ENGINEERS INC. DATE START 4/ CME 75 DATE FINISH 4/ 25"H.S.A. FLUIDS — TOTAL DEPTH ED BY CHAROEN S. WATER DEPTH	/19, /19, 31	/2007 12007 1
SAMF SAMF C SS DC DC DC DC DC DC DC	LE TY utting plit Sp ry Con r'	PES: soon °e	V 7 (VS Wash VX NX Co CS Contin	ore nuous Sa	ampler	SAMPLER SPECIFICATIONS: LengthST_2 LengthZ'' Liner 0.DZ'' Liner 1.DZ'' Other	1	
SDEPTH	BIT	SAMP	SAMP	RECOV.	BLOWS	SYM	SURFACE CONDITION: Grass	SOI PID (L VAPOR
5					het. 0		SOIL/ROCK DESCRIPTION	BC	HS Core
	8.25 H.S.A 4.25 I.D.			20"	444		Augered to 4' o to 4.0' - Cutting - SILT AND CLAY Brown, little sand, little gravel trace roots. Moist. SS 1 4' to 6' 4.0' to 5.7' SILT. Brown, med stiff some sand, little clay. Moist 57' to 60' NO RECOVERY		
1 1 1 1 1 1			L		4		Augered to 9' 6.0'to 9.0' SILT. Brown, some sand, little. clay. Moist		
2 1 1							ssz q'to "		
-10	 			20"	3		9.0' to 10.7' CLAY. Brown, little silt, little sand, moist		
LOCA	TION S	KETC	<u> </u> H		1	<u> </u>	DDMOINT -		
(See	Plo	1.7		G 0-10 10-30 30-50 >50	RANUL Med Very	DENSITY: PROPORTIONS: REMARKS/WEATHER AR: COHESIVE: 50 F Loose 0-4 Soft 0-10% Dense 4-8 Med Stiff 10-20% Little Dense 8-15 Stiff 20-35% Some Dense 15-30 Very Stiff 35-50% And	dy	

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PRELIMINARY _____ FINAL:



CLIENT Latarge North America

BOREHOLE LOG

PO IFC'	T 100	ATION	Wi	ndsor	CO	+	BUREHULE LUG
PROJEC	<u>T NO.</u>		-05	38			BH NO PAGE OF
NORTH	-1					DRILL	ER DRILLING ENGINEERS INC. DATE START 4/19/2007
EAST						RIG	CME 75 DATE FINISH 4/19/2007
GRD E	ELEV.		<u> </u>			BITS 8	.25"H.S.A. FLUIDS - TOTAL DEPTH 31
TOC E	LEV.					LOGGI	ED BY Charoen S. WATER DEPTH 14'
SAMPL CT Cu (SS) Sp DC Dr Other	E TYH Ittings Itt Sp 'y Cor	'ES: ; ; ; e	M N (∜S Wash ∛X NX C CS Contir	ore nuous Sr	ampler	SAMPLER SPECIFICATIONS: Length 2.5' O.D. 2" I.D. 1.7" Other
DEPTH (FT.)(BIT CASING	SAMP NO.	SAMP TYPE	RECOV. FT/FT	BLOWS per 6'	SYM	SURFACE CONDITION: Grass SOIL VAPOR PID FID SOIL/ROCK DESCRIPTION BC HS Core
					4	+	10.7'to 11.0' NO RECOVERY
-11					1		Augered to 14.
-17		'		i		1	11.0'to 14.0' - Cutting - CLAY. Brown
-	. 11			1 1			little silt, little sand moist
-13	8.25			1			
	H.S.A.	'		1 '		/	
-14	425'			. <u>.</u>	8	+	14 of to 15 of SAND AND GOAVEL RYDING
-15	1,0,			12	10	'	med dense trace silt trace day
-	1			124"	17		Wet.
-16				ļ		'	15.0' to 16.0' NO RECOVERY
.						'	Augered to 19
-17				ĺ		1	16.0 To 19.0' - Cutting - SAND AND
10				Í .		1	Wet
-18		$\left \right ^{\prime}$		1		'	
-19		'		I	ļ	!	SS 4 19' to 21'
				22"	12	1	19.0 to 20.8' SAND AND GRAVEL.
-20				24.	- 24	'	Brown very dense trace silt
				<u>L</u>			trace clay. Wet
LOCAT	ION S	<u>КЕТСН</u>			G	RANUL	DENSITY: PROPORTIONS: REMARKS/WEATHER
See Plan 10-30 30-50 >50					0-10 10-30 30-50 >50	Med Very	Loose 0-4 Soft 0-10% Trace 50 F Windy Dense 4-8 Med Stiff 10-20% Little Dense 8-15 Stiff 20-35% Some SUNNY Dense 15-30 Very Stiff 35-50% And

LOG STATUS

PRELIMINARY.

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CLIENT PROJEC	Lat	ATION	e No Wi	orth Ai	<u>merica</u>	a	BOREHOLE LOG
PROJEC	T NO.	LF	-05	38			PAGE OF
NORTI	1					DRILLE	TRILLING ENGINEERS INC. DATE START 4/19/2007
EAST						RIG	CME 75 DATE FINISH 4/19/2007
GRD	ELEV					BITS 8	.25"H.S.A. FLUIDS - TOTAL DEPTH 31"
TOC I	ELEV					LOGGE	D BY Charoen S. WATER DEPTH 14'
SAMP CT Cu SS Sp DC D Other	LE TY Ittings blit Sp ry Cor	PES: 1000n re	۲ ۲ (WS Wash NX NX C CS Contin	ore nuous Sa	mpler	SAMPLER SPECIFICATIONS:
DEPTH	BIT	SAMP	SAMP	RECOV.	BLOWS	SYM	SURFACE CONDITION: Grass Soil VAPOR
(+1)	CASING	NU.	TYPE	FT/FT	per 6"		SOIL/ROCK DESCRIPTION BC HS Core
-20					32 34		20.8'to 21.0' NO RECOVERY
21							Augered to 2.4.
-7.2					}		21.0'to 24.0' - Cutting - SAND
	4						AND GRAVEL. Brown, Trace
-73	8.25						silt trace clay. Wet
	H.S.A				ł		/
-24	1 *						<u>ss 5 24' to 26'</u>
-	1.D			22	12		24.0'TO 25.8' SAND AND GRAVEL
-25				364	12		Brown med dense little
				14	12		sitt, little clay. Wet
-20							410000 KECOVERT
-					}		26 0 to 29 0' - Cutting SAND AND
-1.+							GRAVEL Brown Lettle cit
279							little clay, wet
				1	1		t
29							SS 6 29' to 31'
				14"	42		29.0' to 30.2' SILTSTONE. Brown
-30	ļ	+		24"	40		to redbrown, very stiff, trace
<u> </u>							sand, trace day. Moderately weather
LOCA	TION	SKETC	Н			RANTI	DENSITY: PROPORTIONS: REMARKS/WEATHER
	كوه	2 F	lav	٦	0-10 10-30 30-50	Med	Loose 0-4 Solt 0-10% Trace 50 F Windy Dense 4-8 Med Stiff 10-20% Little Dense 8-15 Stiff 20-35% Some Church
<u> </u>					>50	Very	Dense 15-30 Very Stiff 35-50% And SOWWY

LOC STATUS

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CLIENT	Lat	iarc	12 No	orth Au	merica	r	BOREHOLE LOG	
PROJEC	T LOC	atio L F	<u>1 - 05</u>	ndsor 38	CO		BH NO.	-
NORT	L)				<u> </u>		TRULING ENCINEERCINC	2 /2007
FAST						DRILLE	CME 75	1/2007
GRD	FLEV						25"H S A FUEDS - TOTAL DODAL	1/2007
TOC	FIEV					LOCCE	TOTAL DEPTH	<u>,</u>
SANP	1.F TY	223				LUGGE	SAMPLER STRUCTUATIONS	T
CT C SS S DC D Other	uttings plit Sp ry Cor	1000 1000 1000 1000 1000	1	#S Wash NX NX C CS Contin	ore nuous San	mpler	SAMPLER SPEcifications: Material Steel Length 2.5 Material Steel 0.D. 2" Liner	
DEPTH (FT.)	BIT CASING	SAMI NO.	P SAMP TYPE	RECOV. FT/FT	BLOWS per 6"	SYM	SURFACE CONDITION: Grass SOIL/ROCK DESCRIPTION	SOIL VAPOR 10 710 710 710 710 710 710 710 710 710 7
2027		•						
1-30	• • • • • • • • • • • • • • • • • • • •				45	<u> </u>	Wet.	
					50		30.2' TO31.0' NO RECOVERY	
E SI			EN	DOF	BOREH	OLE	Augered to 29.5	
							Add sand to 29.0'	
1111	0 254			ļ		{ .	End of Borehole	
<u></u>	8.45						Monitoring well Installation	
Li li	H.S.A						2" PVC 10-toot screen	
ulu	120						<u>MW-5</u>	
<u>ulu</u>	1.D					1	· · · · · · · · · · · · · · · · · · ·	
<u> </u>							Casing and lock	
L L						}	Ricer -3 to 18 7/ Concrete O to 3'	
يديل							Screen 18 7/10 28 71 Bentonite chie 3 to	17
Lu Lu							Cap 28.7'to29.0' filter Som 17 to 31	6
E.								
in the second se								
uulu							Filler sand 4 bags	
ىلىپ							Bentonite 6.5 bags	
Li Li							Concrete 2 bags	
E		$\left\{ \cdot \right\}$						
L	1							
LOCA	TION	SKET	СН			DANTZY	DENSITY: PROPORTIONS: REMARKS/WEATHER	
	Sec	Ţ	20.0	`	G 010 1030	Ц И И АЛ Мем	LAN: UUHESIVE: Loose 0-4 Soft 0-10% Trace 50F Winds	1
	توو			N N	30-50 >50	Very	Dense 8-16 Stiff 20-35% Some SUNN Dense 15-30 Very Stiff 35-50% And	/
LOC	STATU	S:				<u></u>	/	

PRELIMINARY.

_____ FINAL: _____

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CLIENT	La	farg	e No	orth A	meric	a	BOREHOLE LOG			
PROJEC PROJEC	CT LOC CT NO.		-05	ndsor 38	<u>, co</u>		Andy & Richard BH NO OF	3		
NORT	'H					DRILL	ER DRILLING ENGINEERS INC. DATE START 4/	19	/20	507
EAST				•		RIG	CME-75 DATE FINISH 4/	19	/Zc	207
GRD	ELEV.					BITS 8	3.25"H.S.A. FLUIDS - TOTAL DEPTH 2	5.3	1	
тос	ELEV.					LOGGI	ed by Charoen S. Water Depth	9'	,	
SAMP CT C SS S DC D Other	LE TY utting plit Sp ry Con r:	PES. s boon re	\ } (VS Wash VX NX C CS Contin	ore iuous Sa	ampler	SAMPLER SPECIFICATIONS: Length 2.5 Material steel 0.D. 2" Liner I.D. 1.7" Other			
DEPTH	BIT	SAMP	SAMP	RECOV.	BLOWS	SYM	SURFACE CONDITION: Grass	SOII	VAP	OR D
(11.)	CASING	.0м Т	TTPE	F77FT	per 6"		SOIL/ROCK DESCRIPTION	BC	HS	Core
							Augered to 4'			
E.							0 to 4.0' - Cutting - SILT AND CLAY			1111
<u>Lin</u>							Dark brown, little sand trace			
<u>-</u> 2	<u>и</u>						roots Moist			
יייןיי	8.25							 		
<u> </u>	H.S.A								·	
	•						SSI 4'to 6'	$\left - \right $		
14 E				194	2		4.0' to 5.6' CLAY, Brown soft			
=5	4.25"				2.		little sith, little sound, Moist			
	I.D.			24'	2		5.6'to 6.0' NO RECOVERY			l i i i
E-6					<u> </u>					
ulu I							Augered to q'			
Ē-7							6.0' TO 9.0' CLAY. Brown some	 		
:. 							Sound , little silt . Moist			
E 8										
E O							887 91 to 11			
E				14"	3	1	9.0'to 10.2' SAND AND GRAVEL	 		
E-10				2.4"	2		Brown, loose little stone un to	<u>†</u> −−†		
							2-includiameter trace silt trace d	ty.	W	et
LOCAT	TION S	KETCH	I		<u> </u>		DENSITY: PROPORTIONS: REMARKS/WEATHER	<u>}</u>	<u> </u>	
9	bee	Plo	\mathbf{v}		G 0-10 10-30	RANULA Med	AR: COHESIVE: Loose 0-4 Soft 0-10% Trace 50 Wind Dense 4-8 Med Stiff 10-20% Little	— 1		
					30~50 >50	Very	Dense 8-15 Stiff 20-357 Some Some Dense 15-30 Very Stiff 35-50% And Some Some	-		

PRELIMINARY: _____ FINAL: _____

CLIENT Latarge North America

BOREHOLE LOG

CLIENT	T LOC	ATION	Wi	ndsor	co	a	BOREHOLE LOG
PROJEC	T NO.	LF	-05	38			PAGE OF
NORT	н					DRILLI	ER DRILLING ENGINEERS INC. DATE START 4/19/2007
EAST						RIG	CME 75 DATE FINISH 4/19/2007
GRD	ELEV.					BITS	8.25"H.S.A. FLUIDS - TOTAL DEPTH 25.3'
тос	ELEV					LOGGI	ed by Charoen S. WATER DEPTH 9'
SAMP CT C SS S DC D Other	LE TY utting plit Sp ry Con r:	PES: s boon re	/ {)	VS Wash VX NX C CS Contir	ore luous S	ampler	SAMPLER SPECIFICATIONS: Length Stee Length Z.5' Material O.D Z'' Liner I.D I.7'' Other
SDEPTH	BIT CASING	SAMP NO.	SAMP TYPE	RECOV. FT/FT	BLOWS per 6	SYM	SURFACE CONDITION: Grass SOIL VAPOR SOIL/ROCK DESCRIPTION BG HS CORE
					13		10.2 to 11.0' NO RECOVERY
							Augered to 14
E-12							11.0 to 14.0 - Cutting - SAND AND
Lul.							GRAVEL. Brown, some stones
E-13	8.25						up to 2-inch diameter, trace
<u>. uu</u>	H.S.A						silt, Trace clay. Wet
E14	4.25"		<u> </u>	144	5		14 0'to 15 7' SAND AND GRAVEL
	ID.				8		Brown med danse some stones
				24	10		up to 2-inch diameter, trace
E-16					20		silt trace day. Wet
							15.2. TO 16.0' NO RECOVERY
EIT							Augered to 19'
<u>ulu</u>							16.0 TO 19.0 - Cutting - SAND AND
E-18							OKAVEL Some siones up to
10							trace day Wet
E				141	6	_	\$\$4 19' to 21'
E-20				24"	8		19.0' to 20.2' SAND AND GRAVEL Brown
						~	meddeuse, some stones up to 2-inch diameter
LOCA	TION	SKETC	<u>H</u>		-	RANUL	DENSITY: PROPORTIONS: REMARKS/WEATHER
	See	PI	an		0-10 10-30 30-51) Med	Loose 0-4 Soft 0-10% Trace 50 Windy d Dense 4-8 Med Stiff 10-20% Little Dense 8-15 Stiff 20-35% Some Company
[1	>50	Very	y Dense 15-30 Very Stiff 35-50% And SUVINY

LOG STATUS

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PRELIMINARY._____ FINAL:

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CLIEI PROJ	NT LO	Tay	rge	2 No Win	ndsor.	<u>neria</u> co	ça		BOREHOLE LOG 6		
PROJ	ECT N	<u> </u>	F	-05	38				PAGE OF	3	
ЮМ	RTH						DRILL	er J	DRILLING ENGINEERS INC. DATE START 4/10	1/2	6007
EAS	5 T						RIG	C	ME 75 DATE FINISH 4/19	120	207
GR	D ELEV						BITS	3,25	5"H.S.A. FLUIDS - TOTAL DEPTH 25.	3	
TO	C ELEV						LOGGI	ED E	by Charoen S. WATER DEPTH G	,/	
SAI CT SS DC O()	MPLE 1 Cuttir Split Dry C her:	YPES gs Spoo ore	5. n	¥ N (/S Wash IX NX Co S Contin	ore nuous S	ampler	S L C I.	SAMPLER SPECIFICATIONS: Length _2.5' Material Steel 0.0 1.07'' Other		
DEP	TH BIT	SA	MP	SAMP	RECOV.	BLOWS	S SYM	ຣບ	JRFACE CONDITION: Grass SOI		яоч П С 1
	TCASI	PG N	U.	TYPE	P"I7F"I	per 6			SOIL/ROCK DESCRIPTION BC	HS	Core
-					1						
正之	0					20		<u>†</u>	trace silt trace clay wet		
	,					30		20	0.2' to 21.0' NO RECOVERY		
TE A	1								Augered to 24-		=
E-7	2						}	21	1.0'to 24.0' - Cutting - SAND AND		
144		4							GRAVEL Brown trace silt.		-
E-2	3 8.2	5							trace clay. Wet		
1111	т.н.s	A.							,		
E-2	4								<u>S\$ 5 24' to 26'</u>		
ահո	14.2					10		24	4.0 to 25.3' SILTSTONE Grey .		ļ
E-2	· · · · ·					50/2	4		very stiff, little sand trace	<u> </u>	
1.1.1.1		-			ENDO	F BO	REHA	- 	clay. Wet		ļ
-2	6								END OF BOREHOLE	ļ	
ulu									Monitoring well installation	-	
L.L.									2° PVC 10. toot screen	 	
<u></u>				sav	d 36	Jags					
<u>ulu</u>				Ber	Howite	56	ags			-	
L L L				Con	crete	2.50	293	1	asing 4 Lock		
<u></u>								R	ing -3 to 137' Convert oto 3'		
11.1								1. (c)	CREW 13 71 to 23 71 Between 13 71 to 23 to 20	+	
				1					dap 23.7' to 24' Filter sand 12'to 25.8'		+
	CATION	SKE	I ETCI			<u></u>	<u></u>	DF	ENSITY PRODOPTIONS PRIADUS / WEATURD		
	See	-	P1	۵۷		0-10 10-3 30-5 >50	GRANU 0 Mec 50 Ver	LAR: Loo d Den Den y Den	Date COHESIVE: PROPORTIONS: REMARKS/WEATHER 0see 0-4 Soft 0-10% Trace 50 F SUMMY nsee 4-8 Med Stiff 10-20% Little 50 F SUMMY nsee 8-15 Stiff 20-35% Some Windy nsee 13-30 Very Stiff 35-50% And		

PRELIMINARY: _____ FINAL: _____

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CLIENT PROJE(CT LOC	ATIO	Wi Wi	ndsor	<u>co</u>	a	BOREHOLE LOG	вн NO. 7		
KOLEC	/1 NU.	<u> </u>	-03		T		TRULING ENCLAREDCINC		10	6
NORT	H					DRILLI	CR DAILLING ENGINEERS INC.	DATE START 7/	19/	5
EAST						RIG	CME - 72	DATE FINISH 4-/	19	120
GRD	ELEV.					BITS C	25 FI.S. A. FLUIDS	TOTAL DEPTH	0	7
TOC	ELEV					LOGGE	b Br Charoen S.	WATER DEPTH	۲	
SAMP CT C SS S DC D Othe	LE TY utting: plit Sr ry Cor r.	PES: s boon re]	WS Wash NX NX C CS Contir	ore Juous Sa	mpler	SAMPLER SPECIFICATIONS: Length 2.5 0.D. 27 1.D. 1.7	Material <u>steel</u> Liner <u> </u>		
DEPTH (FT)	BIT CASING	SAMP NO.	SAMP TYPE	RECOV. FT/FT	BLOWS per 6"	SYM	SURFACE CONDITION: Grass SOIL/ROCK DESCRIPT	YION	SOIL PID BC	VA F HS
-0							Augered to 4'			
- -							0-4.0' - Cutting - SIL	FAND CLAY		
							Dark brown, trac.	e sound.		
- - -							trace roots. Mo	ist		
	0.75									
E Z	0.00									
	H.S.A									
E-4			ļ		ļ		<u>ssi</u> 4'to6'	/		
				18"	2		4.0'to 5.5 CLAY. Bro	sun soft		
<u></u> 5	4.25 ["]						some sand, trac	e silt Moist		.
	1.0.			24	2		5.5' to 6.0' NO RECO	VERY		
							Augered to 9'			
Ęą				ļ			6.0'to 9.0' CLAY Br	om, some		
							sand trace si	H, Moist		
E-8										
<u></u>							· · · · · · · · · · · · · · · · · · ·			
Ę٩				164	10		<u>552 9' To II'</u>			
				1/14	20		1.0 10 10.3 MEDIUM S	AND. Brown	4	
F-10				1-14	1-0-		vense, trace sill	Trace clau	4	
L	<u> </u>						Wet.			
LOCA	TION S	KETC	Н			A N1117	DENSITY: PROPORTIONS: I	REMARKS/WEATHE	R	
	See	Pla	$\lambda \sim$		0-10 10-30 30-50	Med	Arr. COHESIVE: Loose 0-4 Soft 0-10% Trace Dense 4-8 Med Stiff 10-20% Little Dense 8-15 Stiff 20-35% Some	50F Sum Win	y Jy	

PRELIMINARY _____ FINAL ____

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CL PR	IENT . OJEC	Late	Arg	e No	rth Ar	nerica	L	BOREHOLE LOG	BH NO. 7 PAGE Z OF	2.	
PR	OJEC	<u>T NO .</u> 1	<u> </u>	-05	28		DRILLE	R DRILLING ENGINEERS INC.	DATE START 4/	9/:	2007
1	EAST						RIG	CME 75	DATE FINISH 4-/	191	2007
	GRD I	ELEV.					BITS 8	25"H.S.A. FLUIDS -	TOTAL DEPTH	6'	
-	roc I	CLEV.					LOGGE	D BY Charoen S.	WATER DEPTH	9'	
ľ	SAMP	LE TY	PES:					SAMPLER SPECIFICATIONS:	ctee	1	
	T Cu SS SJ DC D	uttings blit Sp ry Cor	oon e	W N C	'S Wash IX NX Co S Contin	ore uous Sa:	mpler	Length <u>2.5</u> 0.D. <u>2</u> " 1.D. <u>1.7</u> "	Material Liner Other		
	ЕРТН	віт	SAMF	SAMP	RECOV.	BLOWS		SURFACE CONDITION: Gras	<u>s</u>	SOII	VAPOR
	(FT)	CASING	NO.	TYPE	FT/FT	per 6"	SYM	SOIL/ROCK DESCRI	PTION	BG	HS Core
Providence of the second s	-10					20		10.3' to 11.0' NO REC	OVERY		
						22					111
111	-11							Augered to	14'		1111
1111								1.0' to 14.0 - Cutting	- CLAY.		1111
1111	-12							Grey some sand	trace silt.		
		10 25					1	Wet			
	-15	10.25 14 SA									
								SS3 14' to	516		
	-1-7	4.25			4	12		14.0'to 15.7' CLAYSTO	DNE . Given .		
	-15	1.0.			20	25		very stiff, trace	e sand trace	-	
					24	27		silt slightly we	athered very n	vaist	
	-16					30		END OF BOREH	OLE		
				E	ND 0	F BOR	EHOU	MONITORING WELL	INSTALLATION	<u>」</u>	
	-17							24 PVC 8-foot	screen_		
	-18							Casing & Lock			
								cap			/
	-19							RISER -3 to 5.7'	ioncrete 07	<u> 2'</u>	
								Screen 5.7' to 13.7' b	entonile 2't	015	<u>_</u>
	E-20							Cap 13.7' to14.0' +	illier sound 5 t	10	2
	I.OC.	ATION	SKET	СН				DENSITY: PROPORTIONS	REMARKS/WEATH	ER	
						0-10	RANU	LAR: COHESIVE: Loose 0-4 Soft 0-10% Trac	50F SU	nny	
		See.	F	nom		10-30) Me	i Dense 4-B Med Stiff 10-20% Littl	• Win	2	
						30-50 >50) Ver	Uense 8-15 Stiff 20-35% Som y Dense 15-30 Very Stiff 35-50% An	e d	-1	
	<u>l</u>					<u></u>		<u></u>			

LOC STATUS

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PRELIMINARY:

FINAL:



LIENT	Lat	arg	e No	orth A.	merica	a	BOREHOLE LOG	BH NO 8		
ROJEC	T LOC		-05	38			Andy & Richard	PAGE OF	3	_
NORT	'H					DRILLE	R DRILLING ENGINEERS INC.	DATE START 4/	19/2	C
EAST						RIG	CME - 75	DATE FINISH 4/	19/2	.6
GRD	ELEV					BITS 8	25"H.S.A. FLUIDS	TOTAL DEPTH	8.3'	
тос	ELEV.					LOGGE	D BY Charoen S.	WATER DEPTH	91	
SAMP CT C SS S DC T Othe	PLE TY uttings plit Sp Dry Cou r:	PES: s boon re	1	WS Wash NX NX C CS Contin	ore nuous Sa	mpler	SAMPLER SPECIFICATIONS: Length 2.5 O.D. $2''$ I.D. 1.7	Material <u>stee</u> Liner <u> </u>		
DEPTH	BIT	SAMP	SAMP	RECOV. FT/FT	BLOWS	SYM	SURFACE CONDITION: Grass	mio N	SOIL V	ī.
	CASING				por 0		SOIL/ROCK DESCRIP	110N	BGH	5
	8.25° H S A						Augered TO 4' o to 4.0' - Cutting - CLAY. Dark bro sand, trace root	SILT AND m. trace is. Moist		-
							SS1 4 te	0 6'		-
E				164	Z		4.0'to 5.0' CLAY De	ark brown	_	
Ē-5	A.25	1	22		3		stiff little sand	trace silt		-
1111	1.D.			74"	9	1	Moist	0000		
<u>-</u> 6							5.0'to 5.3' SAND AND	SCRAVEL.		
1111							isson med dense Trac	2 STIT_ MOISI	<u></u>	_
E7							S.S. TO 6.0 NO RECOV	<u>EKI</u>		-
يدأي							Gotto 90' SANT ANT	D CONTE		
E-8							REPUIS COME of A	U GRAVEL		
							diameter some	class Veryman	5+	
Eq				124	7		ssz a'to	11		-
EE .			155	1/14"	12		9.0to 10.0' SAND AND	GRAVEL		•
F-10			-				Brown, med den	se, some stor	us	
LOC	ATION	SKETC	н Н				DENSITY: PROPORTIONS:	REMARKS/WEATHI	ER	
	See	P	lan		G 010 1030 30-50 >50	RANUL Med Very	AR: COHESIVE: Loose 0-4 Soft Dense 4-8 Med Stiff Dense 8-15 Stiff Dense 15-30 Very Stiff 35-50% And	SOF som Wind	Υ Υ	

LOC STATUS:

PRELIMINARY _____ FINAL:



CI PI	LIENT ROJEC	Lat	ATIO	ge NN_	No Win	ndsor	meric co	a		BORE	HOL	ΕL	.OG		BH NO	8			
۲ آ	KOTEC	T NO.	<u> </u>		03	28							0		PAGE	OF			
Ļ	NORT	H						DRILL	ER	DRILL	ING F	EN	GINEER	S INC.	DATE START	4/1	1/2	200	<u>'†</u>
	EAST							RIG	<u>_C</u>	ME 7	5				DATE FINIS	4/	19/	20	07
	GRD	ELEV				<u> </u>		BITS	3,29	5"H.S.	A. FI	UID)s —		TOTAL DEPT	<u>тн 18</u>	3.7	<u>)</u>	
	TOC	ELEV.						LOGG	ED	BY C'h	aro	ev	<u>, S.</u>	<u></u>	WATER DEP	тн	9	/	
	SAMP CT C SS S DC D Other	EXAMPLE TYPES: T Cuttings WS Wash SS Split Spoon NX NX Core CDry Core CS Continuous Other:								SAMPLEF Length _ O.D I.D	2 SPEC 2.5 2" 1-7"		CATIONS:		Material Liner Other	stee			
gr	EPTH	BIT	SAM	P SI	AMP	RECOV.	BLOWS	SVA	รเ	JRFACE	CONDI	TIO	N:G	aras	S		SOIL PID	, VAP	OR
	(1"1".)	CASING	NO T	. T	YPE	FT/FT	per 6		ļ		S	SOIL	/ROCK D	ESCRIP	TION		BC	HS (Core
- For			·		1	:	:												
<u> </u>	-10						6		+	<u> </u>		ta	2-100	h dia	motor tr	aro.		-	
	•						4		-				V 2	Jot					1111
	-11								10	.0' to	11.0'	7.1	VO RI	ECOV	JERY				
	-17								Ti				Auger	ed to	5 14'				111
									11	o'to	14.0	5' -	- Cutt	ina	- SAND	AND			
1111	-13	875									GRA	IV!	SL.E	Brown	, some s	tones			
		H.S.A			[up 1	to	2-inc	hdi	ameter. U	Jet			
	-14	1 25"				•••••••••					1		SS 3	14	to 16'				
		1D.				184	5		14	.0 to 1	5.5'		SAND	AND	GRAVEL	. Brov	m		
	-15				SS		5				med	<u>.</u> d	lense,	Son	ne stones	up t	0		
	-					24	10				<u>2-i</u> 1	ncl	<u>n dian</u>	neter	. Wet				
	-16			-					1!	5.5'to	>16.0	<u>,/</u>	NO	RE	COVERY				
	-												Auger	ed t	0 17'				
	-17			-		. 4	10		116	.0 tol	7.0		Cottiv	<u>q -</u>	SAND AN	D			
	<u>.</u>	ļ				16	30		-		SRAU	161	<u> Bro</u>	un E	ioma ston	<u>le_ 0</u>	, to	<u>, S</u>	_inda
	-18	18.3				16"	50/4	<u>//</u>	1-	-/-	10 21	,	554	17/4	019		3/	am	eler
				Τ	ĘŊ	ID OF	BORE	HALE		0 TO	100	·	CLAY	SION	E. Grey	, very			
1111	-19										117-1	- <u>-</u>	ione s	Sille	sne little	2 Same			
										······	<u>- 190</u>	7	/ Wear	nered	Very m	018			
	- 20		┝╌┼				<u> </u>		┿	·····	EN		OF PC	DEH	NE				
		<u> </u>					<u> </u>												
	LOCA	TION S	KET	СН	<u>.</u>		-	RANUI		ENSITY:	ESIVE		PROPOR	TIONS:	REMARKS/WI	EATHER			
	0		ت				0-10		Loc	ose 0-4	20110. S	soft	0-10%	Trace	SOFS	งบทพ	1		
	0	وو	41	av	\sim		30-50	, Med)	Der Den	18e 4-8 1se 8-15	Med S S	tiff tiff	10-20% 20-35%	Little Some		wind	t V		
							>50	Very	Der	nse 15-30	Very S	uirr	35-50%	And		-	1		

LOC STATUS:

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CLIEN	ECT LOC	ATION	e No	ndsor	<u>co</u>	a	BOREHOLE LOG BH NO.
PROJ	ECT NO.	<u> </u>	-05	38			PAGE <u>3</u> OF <u>3</u>
NOF	RTH				·	DRILLE	ER DKILLING ENGINEERS INC. DATE START 4/19/2007
EAS	i]'					RIG	CME 75 DATE FINISH 4/19/2007
GRI) ELEY.		·····	·····		BITS	1.25"H.S.A. FLUIDS - TOTAL DEPTH 18.3'
TOC	ELEV.					LOGGE	ed by Charoen S. Water Depth 9'
	APLE TY Cutting Split Sp Dry Con Her:	PES: s poon re	۲ ۲ (VS Wash NX NX C CS Contir	ore nuous Sa	ampler	SAMPLER SPECIFICATIONS: Length 2.5' O.D. 2" I.D. 2.7'' Other
DEPI	TH BIT	SAMP	SAMP	RECOV.	BLOWS	SYM	SURFACE CONDITION: Grass Soil VAPOR
		NO.	TYPE	FT/FT	per 6		SOIL/ROCK DESCRIPTION BC HS Core
مانىيىلىتىن <u>قەرىمە مەرىمىلىتىنى مەرىمىدىنىن ئىمىرىمىدىنى مەرىمىلىتىن مەرىمىلىتىن مەرىمە مەرىكەندە بەرمە</u>	8.25 H.S.A 4.25 I.D.						Monitoring Well Installation 2" PVC 10-foot Screen MW-8 Casing and lock Cap Riser -3 to 6.7 Concrete 0 to 2' Scroen 6.3 to 16.3 Bentonite Chip 2 to 5 Cap 16.3 to 16.5 Filter Sand 5 to 18.3'
					ļ		
F		+					
LO	CATION	SKETC	H				DENSITY: PROPORTIONS: REMARKS/WEATHER
	Cee	P	lan		(0-10 10-3(30-5) >50	GRANUL D Med O Very	LAR: COHESIVE: Loose 0-4 Soft 0-10% Trace 50 F Sunny Dense 4-8 Med Stiff 10-20% Little Dense 8-15 Stiff 20-35% Some Windy Dense 15-30 Very Stiff 35-50% And

LOC STATUS

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PRELIMINARY._____ FINAL:

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CLIENT	r Lat	farg	eN	orth A	meric	a	BOREHOLE LOG	Q	
PROJE PROJE	CT LOC CT NO.		-05	ndsor 38			Andy & Richard	BH NO.	3
NORT	гн					DRILL	ER DRILLING ENGINEERS INC.	DATE START 4/	20/2007
EAST	, 					RIG	CME-75	DATE FINISH 4/	20/2007
GRD	ELEV					BITS	3.25" H.S.A. FLUIDS -	TOTAL DEPTH	51
тос	ELEV.		, 			LOGGI	od by Charoen S.	WATER DEPTH	<u>۹′</u>
SAMI CT C SS S DC ! Othe	PLE TY Sutting Split Sp Dry Con r:	PES: s boon re	1	WS Wash NX NX C CS Contin	ore nuous Sa	mpler	SAMPLER SPECIFICATIONS: Length 2.5 0.D. 2 1.D. 1.7	Material Steel Liner Other	
DEPTH	BIT	SAMP	SAMP	RECOV.	BLOWS	SYM	SURFACE CONDITION: Grass		SOIL VAPOR PID FID
		10.		F1/F1	per o		SOIL/ROCK DESCRIP	TION	BG HS Core
<u> </u>	8.25 H.S.A. 4.25 I.D.		SS	16" 244	きん しょう		Augered to 4' 0 to 4.0' - Cutting - S Dark brown, tra Moist SS1 4'to 4.0'to 5.3' SAND AND Brown, med dens. Trace clay, Ma 5.3' to 6.0' NO RECC Augered to	BILT AND CLA ce sond. 6' D GIRAVEL. e. Trace sill DIST DVERY 9'	
10 International			SS	12"	10 15		6.0' to 9.0' - Cutting GRAVEL. Brown trace clay. Mo SS 2 9' to 9.0'to 10.0' SAND ANT Brown, dense, Son 2-inch diameter	3AND AND trace silt, Dist U' D GRAVEL, me stone upto trace silt.	Wet
LOCA	TION S	KETCI	ł			RANTI	DENSITY: PROPORTIONS:	REMARKS/WEATHER	<u>}</u>
3		PI	24		0-10 10-30 30-50 >50	Med Very	Int.CUTESIVE:Loose $0-4$ Soft $0-10\%$ TraceDense $4-8$ Med Stiff $10-20\%$ LittleDense $8-15$ Stiff $20-35\%$ SomeDense $15-30$ Very Stiff $35-50\%$ And	50 F Suni	^Y

PRELIMINARY._____ FINAL: _____

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U.

CLIENT PROJEC	Lat	à rg.	e No Win	orth Ar	<u>neric</u>	a	BOREHOLE LOG	2
PROJEC	T NO.	LF	-05	38				2
NORT	H					DRILLI	R DKILLING ENGINEEKS INC. DATE START 412	hard
EAST						RIG	CIME 75 DATE FINISH 4/2	6/2007
GRD	ELEV.					BITS 6	25 FI.S. A. FLUIDS - TOTAL DEPTH T	2/
TOC	ELEV					LOGGI	D BY Charoen S. WATER DEPTH	
SAMP CT C SS S DC D Other	LE TY ulting plit S ry Co r:	PES: s poon re)) (YS Wash NX NX C CS Contir	ore nuous S	ampler	SAMPLER SPECIFICATIONS: Length 2.5' 0.D. 2" 1.D. 1-7" Other	
DEPTH	BIT	SAMP	SAMP	RECOV.	BLOWS	SVV	SURFACE CONDITION: Grass	
(FT)	CASING	; NO	TYPE	<u> </u>	per 6		SOIL/ROCK DESCRIPTION	BG HS Core
10					17 10		10.0' to 11.0' NO RECOVERY	
1-11							Augered to 14-	
10							11.0 to 14.0 - Cutting - SAND AND	
							GRAVEL Brown, some stones	
E13	8.20						up to 2-inch diameter	
E L	14.S.	A						
E14	4 25	//					<u>SS 3 14 10 16</u>	
1.11	ID			18	12		14.0 TG 15.5 SILISTONE. Grey.	
E-15			SS		17		al Obstations and Track	
1111				24	20		Varia variet	
E16				ENDO	ERAD	FUIDIF	Augered to 16'	
EL.							FND OF BOREHOLE	
ドヨ								
							Monitoring well Installation	
E18							2ª PVC 10-foot screen	
E 10							MW-9	
E-70	<u></u>							
	-							
Loc	ATION	SKET	L CH			1	DENSITY: PROPORTIONS: REMARKS/WEATHE	<u>1 1 1</u> R
	See.	PI	an		01 10- 30- >50	GRANU o 30 M 50 Ve	LAR: COHESIVE: Loose 0-4 Soft 0-10% Trace d Dense 4-8 Med Stiff 10-20% Little 50 F Sunny Dense 8-15 Stiff 20-35% Some y Dense 15-30 Very Stiff 35-50% And	Y

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PRELIMINARY.______FINAL:



PROJECT NO. LE - 2538 PAGE 3 or 3 NORTH DRILLER DRILLING ENGINEERS INC DATE START 4/20/2007 LAST NIC CME 75 DATE FIRST 4/20/2007 CRD ELEV. BYS 8/25/11.5.4. [PUIDS - TOTAL DEPTH 16' TOC ELEV LOGGED BY C'HAPOEN S. WATER DEPTH 9' SAMPLET YPPS CC Cutings Sempler CS Continuous Sempler CD TYPE SC Continuous Sempler CD TYPE SC CONTINUOUS SEMPLER SPECIFICATIONS: CC Cutings CS Continuous Sempler CD TYPE SC CONTINUOUS SEMPLER SPECIFICATIONS: CC Cutings CS Continuous Sempler CD TYPE SC CS Continuous Sempler CS Continuous Sempler CD TYPE SC CS Continuous Sempler CS CONTINUUM GE CONDITION. Grass SIMPLER SPECIFICATIONS CC CAD 15.7' Concrete 0 402' CC CAD 15.7' to 16 filter Semi 5'to 16 CAD 15.7' to 16 filter Semi 5'to 16 CD CONCrete 1 Dag Somd 4 DagS Bentonite Chip 2' bags CC CATION SKETCH C 2 Plan CONTINUAR CONSTRUCT CONSTRUCT SEMPLER C 2 Plan C 2	CLIEI PROJ	NT IECT	LAT	ATIO	e No	ndsor,	<u>neric</u> co	<i>ia</i>	BOREHOLE LOG
NORTH DRILLER DRILLING, ENGINEERS INC. DATE START 4/20/2007 INAT RIG CME 75 DATE FINISH 4/20/2007 CRD ELEV BITS 8,25"H.S.A. [FLUIDS TOTAL DEPTH 16' TOC ELEV LOGGED BY Charoen S. WATER DEPTH 9' SAMPLE TYPES: SAMPLER SPECIFICATIONS: Material Steel COULTRON CS Continuous Sampler SAMPLER SPECIFICATIONS: Material Steel DID 12." Other Other Other UHER SAMPLER SPECIFICATIONS: Material Steel 0.0." UHER SOIL/ROCK DESCRIPTION Other 0.0." UHER FIFTH BIT SAMP SAMP RECOV BLOWS SYN UHER SOIL/ROCK DESCRIPTION 0.0." 0.0." UHER FIFTH BIT SAMP SAMP RECOV BLOWS SYN UHER SAMPLER SPECIFICATIONS: Material Steel UHER Casing & Lock. Cap Riser -3 to 5.7' Concrete 0.02' SCREED, J.7' to 16', Filter Samd 50' A. Song Sample Chip 0.0." Streen J.7' to 16', Filter Samd 50' Gamed 4. bags Sample Chip SAMP Base Streen J.7' to 16', Filter Samd 50' Bentonite Concrete <td>PROJ</td> <td>JECT</td> <td>` NO</td> <td>LF</td> <td>-05</td> <td>38</td> <td></td> <td></td> <td>PAGE OF</td>	PROJ	JECT	` NO	LF	-05	38			PAGE OF
LAST PIG C.M.E. 7.5 DATE FINISH 4/20 / 2007 CRD ELEV BITS 8, 25" H.S. A., PLUIDS TOTAL DEPTH 16' TOC ELEV LOOGED BY Charoen S. WATER DEPTH 16' SAMPLE TYPES Calings Sampler Sampler Material Steel DET Y Core NS Nash Sampler Sampler Material Steel DIL D. 2.7 Material Steel Material Steel DIL SAMPLE TYPES Continuous Sempler Soll./ROCK DESCRIPTION Material Steel UPPTM BIT SAMP RECOV BLOWS SYM SURFACE CONDITION: Material Steel UPPTM BIT SAMP NECOV BLOWS SYM SURFACE CONDITION: Grass Material Steel UPPTM CRIME NO. TTPE TYPE PT/PT SOIL/ROCK DESCRIPTION BE IN SCOT BE IN SCOT Casing & Cock Cap Riser -3 to 5.7' Concrete 0 to 2' SCreen 5.7' to 15.7' Deutonile Chi p 2' to 5 Cap 1.0 Cap 15.7' to 16' Cap 15.7' to 16' Imp 4.25' GRANULAR Concrete 1 bag Sound 4 bag3 Bentovite Chi p 2' bag3 Imp Caling and the sound steel of a bag Sound Sound Sound I.D. <	NO	RTH						DRILLI	LER DRILLING ENGINEERS INC. DATE START 4/20/200-
GRD ELEV. TOTAL DEPTH	EA.	51						RIG	CME 75 DATE FINISH 4/20/200-
TOC LEV LOGGED BY Charcen S. WATER DEPTH 9' SAMPLE TYPES. SAMPLER TYPES. SAMPLER SPECIFICATIONS: Material Steel Other Colspan="2">Material Steel Other Colspan="2">Continuous Sempler Colspan="2">Material Steel Other Continuous Sempler DURPM BIT SAMP RECOV BLOWS SYN SURFACE CONDITION: Grass SOL WATCH Casing & Lock	GR	DE	LEV.			·····		BITS	8.25"H.S.A. FLUIDS - TOTAL DEPTH 16'
SAMPLE TYPES: CC Cultings DD put Space SAMPLER SPECIFICATIONS: Length 2:52 Ungth 2:522 Ungth 2:52 Ungth 2:522 Ungth 2:522 Ungth 2:522 Ungth 2:52	TO	C E	LEV					LOGGI	sed by Charoen S. WATER DEPTH 91
DEPTH BIT SAMP SAMP BECOV BLOWS SYM SURFACE CONDITION Grass SOL / ROCK (IPT) CASING NO. TYPE FT/PT PT SYM SURFACE CONDITION Grass NOL VAPOR SOLL/ROCK DESCRIPTION NO NO NO NO NO RECOV BLOWS SYM SURFACE CONDITION Grass NO SOLL/ROCK DESCRIPTION NO NO NO NO Recov Cosing & Lock Cap No NO Riser -3 to 5.7 Concrete 0 to 5 Cap HSA Concrete 1 bag Image: Sourd Sourd HSA Sourcete bag Image: Sourd Image: Sourd Gancrete bag Image: Sourd Image: Sourd Image: Sourd I.D. Concrete bag Image: Sourd Image: Sourd Gancrete bag Image: Sourd Image: Sourd Image: Sourd I.D. GRANULAR Collesive: Chip Density: Sourd Sourd I.D. GRANULAR Collesive: Sourd Sourd Sourd I.D. Image: Sourd Image: Sourd Sourd Sourd I.D. GRANULAR Collesive: S	SA CSDC ot	MPL Cu Spl Dr her	E TYH ttings lit Sp y Cor	PES: boon e]	YS Wash VX NX C CS Contir	ore nuous S	ampler	SAMPLER SPECIFICATIONS: Steel Length 2.5' Material 0.0. 2" Liner 1.0. 1.7" Other
Soll/ROCK DESCRIPTION BO INS Core SOL/ROCK DESCRIPTION BO INS Core SOL/ROCK DESCRIPTION BO INS Core Casing & Lock Cap IS 27 to 15.7 Concrete o to 2' Screen 5.7 to 15.7 Bentanitechip 2 to 5 Cap IS.7 to 16 Filter sand 5 to 16 4.25 I.D. Concrete I bag Sond 4 bags Bentovite chip 2 bags Bentovite chip 2 bags I.D. IOCATION SKETCH CRANULAR COHESIVE COHESIVE CONSTITUTE CONSTITUTE CONSTITUTE CONSTITUTE Soll/ROCK DESCRIPTION REMARKS/WEATHER SOL/ROCK DESCRIPTION BO INS Core Cap IS.7 to 15.7 Gentanitechip 2 to 5 Cap IS.7 to 16 Filter sand 5 to 16 Concrete I bag Sond 4 bags Bentovite chip 2 bags Soll/ROCK DESCRIPTIONS Soll/ROCK	SDEP	TH	BIT	SAM	SAMP	RECOV.	BLOWS	S. SYM	SURFACE CONDITION: Grass SOIL VAPOR
B25 Cassing & Lock Cap Riser -3 to 5.7' Concrete 0 to Z' Riser -3 to 5.7' Lots.7' Benonitechip 2' to 5 Screen 5.7' to 15.7' Benonitechip 2' to 5 Cap 15.7' to 16 filter samd 5 to 16 4.25' I.D. Concrete 1 bag Somd 4 bags Bentovite chip 2' bags Bentovite chip 2' bags GRANULAR Cottesive 0-10 Cottesive 0-10 Bare 1-8 Med Sutt 10-2000 Soft 50-1000 Soft 60-1000 Soft 50-1000 Soft 60-1000 Bare 1-8 Med Sutt 10-2000 Soft 60-1000		1. / (C	-noing			F1/F1	per o	·	SOIL/ROCK DESCRIPTION BC HS Core
B.25 Cassing & Lock Cap Riser -3 to 5.7 Concrete 0 to 2' Riser -3 to 5.7 to 15.7 Bendonitechip 2' to 5 Screen 5.7 to 15.7 Bendonitechip 2' to 5 Cap 15.7 to 16 Filter sand 5 to 16 4.25 I.D. Concrete 1 bag Sound 4 bags Bentonite chip 2 bags Bentonite chip 2 bags Concrete 1 bag Sound 4 bags Bentonite chip 2 bags Concrete 1 bag Sound 4 bags Bentonite chip 2 bags Concrete 1 bag Sound 4 bags Bentonite chip 2 bags Concrete 1 bag Sound 4 bags Bentonite chip 2 bags Concrete 1 bag Sound 4 bags Bentonite chip 2 bags Bentonite chip 50 F Sunny Source base Source base <tr< td=""><td>3</td><td></td><td>1</td><td></td><td></td><td></td><td></td><td></td><td></td></tr<>	3		1						
B25 B25 B25 HSA Casing & Lock Cap Riser -3 to 5.7/ Concrete 0 to 2' Screen 5.7' to 15.7' Bendonilo chip 2' to 5 Cap 15.7' to 16 filter sand 5' to 16 Concrete 1 bag Sand 4 bags Bentovite chip 2' bags Bentovite chip 2' bags Bentovite chip 2' bags Concrete 1 bag Sand 4 bags Bentovite chip 2' bags Bentovite chip 2' bags Concrete 1 bag Sand 4 bags Bentovite chip 2' bags Bentovite chip 2' bags Source 1 bag Sand 4 bags Bentovite chip 2' bags Source 1 bag Source 1 bag	E								
Casing & Lock Cap Riser -3 to 5.7' Concrete 0 foz' Riser -3 to 5.7' Concrete 0 foz' Screen 5.7' to 15.7' Bentonilo chip 2' to 5 Cap 15.7' to 16 Filter sand 5 to 16 425' I.D. Concrete 1 bag Sand 4 bags Bentovite chip 2 bags Bentovite chip 2 bags Concrete 1 bag Sand 4 bags Bentovite chip 2 bags Concrete 1 bag Sand 4 bags Bentovite chip 2 bags Sand 5 bags Bentovite chip 5 bags Sand 5 bags Bentovite 5 F SUNWY See Plan So base 4-8 ked suff 10-200 Little So F SUNWY									
825 Riser -3 to 5.7' Concrete 0 to 2' 825 Screen 5.7' to 15.7' Bendonitechip 2' to 5 425' Cap 15.7' to 16 Filter samd 5' to 16 425' Concrete 1 bag 500 Sound 4 bags Bentonite chip 2 bags	- 								Casing & Lock
Riser -3 to 5.7' Concrete 0 fo2' Screen 5.7' to 15.7' Bendonitochip 2' to 5 Cap 15.7' to 16 Filter samd 5 to 16 4.25' I.D. Concrete 1 bag Sound 4 bags Bentonite chip 2 bags Density: PROPORTIONS: REMARKS/WEATHER CARNULAR: COHESIVE: 0-10 Loose 0-4 Sott 0-107 Trace So F SUNWY 30-50 Very Staff 36-507 And	111								Сар
Screen 5.7 to 15.7 Bentonillochip 2'to 5 Cap 15.7 to 16 Filter sand 5'to 16 Cap 15.7 to 16 Filter sand 5'to 16 Cap 15.7 to 16 Filter sand 5'to 16 Concrete 1 bag Sand 4 bags Bentonite chip 2 bags Bentonite chip 2 bags Cap 15.7 to 16 Filter sand 5'to 16 Concrete 1 bag Sand 4 bags Bentonite chip 2 bags Cap 15.7 to 16 Filter sand 5'to 16 Concrete 1 bag Sand 4 bags Bentonite chip 2 bags Cap 15.7 to 16 Filter sand 5'to 16 Concrete 1 bag Sand 4 bags Bentonite chip 2 bags Cap 15.7 to 16 Filter sand 5'to 16 Concrete 1 bag Sand 4 bags Bentonite chip 2 bags Cap 15.7 to 16 Filter sand 5'to 16 Concrete 1 bag Sand 4 bags Bentonite chip 2 bags Sand 5 bags Bentonite chip 2 bags Sand 5	لدينا		0.04						Riser - 3 to 5.7' Concrete 0 to2
H.S.A 4.25 I.D. Concrete 1 bag Sand 4 bags Bentonite chip 2 bags Bentonite chip 2 bags Concrete 1 bag Sand 4 bags Bentonite chip 2 bags Concrete 1 bag Sand 5 bags Sand 5 bags	<u></u>		8,25						Screen 5.7 to 15.7 Bentonile chip 2 to 5
LOCATION SKETCH LOCATION SKETCH LOCATION SKETCH LOCATION SKETCH LOCATION SKETCH LOCATION SKETCH LOCATION SKETCH LOCATION SKETCH LOCATION SKETCH CRANULAR COHESIVE O-10 COHESIVE COHESIVE O-10 COHESIVE COHESIVE O-10 COHESIVE COH	L.L.L		H.S.A						Cap 15.7 to 16 Filter sand 5 to 16
LOCATION SKETCH LOCATION SKETCH LOCATION SKETCH CRANULAR CRANULAR COHESIVE: COHESIVE: COHESIVE: COHESIVE: PROPORTIONS: REMARKS/WEATHER COHESIVE: COHESIV	1111		1 4						
LOCATION SKETCH Concrete 1 bag Sand 4 bags Bentonite chip 2 bags Bentonite chip 2 bags DENSITY: PROPORTIONS: REMARKS/WEATHER GRANULAR: COHESIVE: O-10 Loose 0-4 Soft 0-10% Trace CO F SUNM SO F SU	1.1.1		4.25 T						
LOCATION SKETCH CRANULAR: CRANULAR: CRANULAR: CHESIVE: 0-10 Location Sketch CRANULAR: COHESIVE: 0-10 10-30 Med Danes 4-6 Med Stiff 10-202 Little 30-50 Dense 8-15 Stiff 20-352 Some 35-502 And	<u>ulu</u>		1.0.						Concrete 1 bag
LOCATION SKETCH CRANULAR COHESIVE: CRANULAR COHESIVE: 0-10 10-30 Med Danse 0-4 30-50 20-4 30-50 20-4 20-10 20-4 20-10 20-4 20-10 20-4 20-10 20-4 20-10 20-20 20-4 20-20	LL LL								Sand 4 bags
LOCATION SKETCH CRANULAR: COHESIVE: 0-10 0-10 CRANULAR: COHESIVE: 0-10 0-10 0-30 Med Danse 4-8 Med Stiff 10-30 Med Danse 4-8 Med Stiff 10-202 Little 30-50 Dense 8-15 Stiff 20-352 Some 350 F. SUMMY 50 F. SUMMY	<u>بيا. ر</u>								Benlouite chip 2 bags
LOCATION SKETCH CRANULAR: COHESIVE: 0-10 10-30 Med Danse 4-8 Med Stiff 10-30 Med Danse 4-8 Med Stiff 10-30 Med Danse 4-8 Med Stiff 10-30 Dense 8-15 50 F SUMMY 50 F SUMMY	بالبد					ſ			
LOCATION SKETCH DENSITY: PROPORTIONS: REMARKS/WEATHER GRANULAR: COHESIVE: 0-10 Loose 0-4 Soft 0-10% Trace 0-10 Loose 0-4 Soft 0-10% Trace 50 F SUMMY CRE Plan 30-50 Dense 8-15 Suff 20-35% Some 50 F SUMMY 50 F SUMMY	<u></u>								
LOCATION SKETCH LOCATION SKETCH CRANULAR: COHESIVE: 0-10 10-30 Med Danse 30-50 Very Dense 15-30 Very Stiff 250 F SUMMY And SOF SUMMY AND AND AND AND AND AND AND AND	<u>. 11</u>								
LOCATION SKETCH LOCATION SKETCH CRANULAR: COHESIVE: 0-10 10-30 Med Danse 4-8 Med Stiff 10-20x	E .								
LOCATION SKETCH LOCATION SKETCH CRANULAR: COHESIVE: 0-10	u.u.u								
LOCATION SKETCH DENSITY: PROPORTIONS: REMARKS/WEATHER GRANULAR: COHESIVE: 0-10 Loose 0-4 Soft 0-10% Trace 0-10 Loose 0-4 Soft 0-10% Trace 10-30 Med Dense 4-8 Med Stiff 1D-20% Little 30-50 Dense 8-15 Stiff 20-35% Some >50 Very Dense 15-30 Very Stiff 35-50% And	سلہ								
IDCATION SKETCH DENSITY: PROPORTIONS: REMARKS/WEATHER GRANULAR: COHESIVE: 0-10 LOOSE 0-4 Soft 0-10% Trace 50 F SUMMY See Plan Jo-30 Med Dense 4-8 Med Stiff 1D-20% Little 50 F SUMMY So-50 Dense B-15 Stiff 20-35% Some Some So Very Dense 15-30 Very Stiff 35-50% And	<u>ulı</u>								
IOCATION SKETCH DENSITY: PROPORTIONS: REMARKS/WEATHER GRANULAR: COHESIVE: 0-10% Trace 50 F See Plan 10-30 Med Dense 4-8 Med Stiff 10-20% Little 30-50 Dense 6-15 Stiff 20-35% Some >50 Very Dense 15-30 Yery Stiff 35-50% And	1		 	╌┼╼╌┥		+			
LOCATION SKETCHDENSITY:PROPORTIONS:REMARKS/WEATHERGRANULAR:COHESIVE: 0-100-4Soft0-10%TraceSeePlan10-30Med Dense4-8Med Stiff1D-20%Little30-50Dense8-15Stiff20-35%Some>50Very Dense15-30Very Stiff35-50%And	L		<u> </u>			<u> </u>	<u> </u>		
Cel Plan Source Date of Loose 0-4 Soft 0-10% Trace 50 F Sunny Soft 0-30 Med Dense 4-8 Med Stiff 1D-20% Little 30-50 Dense 8-15 Stiff 20-35% Some >50 Very Dense 15-30 Very Stiff 35-50% And	\mathbb{P}	OC V.	TION	SKE	СН			GRANII	DENSITY: PROPORTIONS: REMARKS/WEATHER
Cel Plan 30-50 Dense 8-15 Stiff 20-35% Some >50 Very Dense 15-30 Very Stiff 35-50% And		\sim		-			0-1	0	Loose 0-4 Soft 0-10% Trace 50 F SUNNY
>50 Very Dense 15-30 Very Stiff 35-50% And		S	el	P	lan		10-1 30-	30 Me 50	ded Dense 4-8 Med Stiff 1D-20% Little ////////////////////////////////////
							>50	Ver	ery Dense 15-30 Very Stiff 35-50% And

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PROJEC	T LOC T NO.	ATION L F	-05	ndsor, 38	<u> </u>		And	y d	Rich	ard		BH NO OF	.Z		
NORT					1	DRILLE		JLLIN	IG EN	GINEER	S INC.	DATE START 4/	20	120	07
EAST						RIG CME-75 DA				DATE FINISH 4/2	0/	200	7		
GRD	ELEV.					BITS 8	25"	H.S.A	. FLUID	s	-	TOTAL DEPTH	15,	3′	
TOC	ELEV.					LOGGE	DBY	Cha	roev	νS.		WATER DEPTH	4	/	
SAMP	LE TY	PES					SAM	PLER	SPECIFI	CATIONS:		steel			
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Other	ry (or	е 		.5 Contin	uous sa	mpter		***				o ther			
DEPTH	BIT	SAMP	SAMP	RECOV.	BLOWS	SYM	SURF	ACE CO	ONDITIO	N: <u>G</u> ra	223		SOI PID[L VAP	OR D
(FT.)	CASING	NO.	TYPE	FT/FT	per 6				SOIL	/ROCK D	ESCRIP	TION	BC	HS	Core
								A	ugered	d to	4'				
							$o t_c$	<u>, 4.ó</u>	(Cutting	9-	CLAY. Dark	ļ		
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E2								+	race	roots	<u> </u>	Dist			
<u>ماين</u>	8.25														
-3	HSA								<u> </u>	<u>^ /</u>	+a /	· /			
يداي	1.0.0						1.	+	<u>>> </u> 5 2'	SAN	ID AN	ND GRAVEL	+		
E 4				.14	8		4.0	<u>10</u> T	Brown	1009	50 0	ome stones			1111
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L S	1.D.			24"	3				silt.	Wet					-
E,					3		5.3	to 6	» . 0	NOR	ECO	IERY			
0									Aug	exed .	to 9	/			
E a							6.0	to9	<u>_0′ ′</u>	- Cutt	ing	- SAND AND	<u>\</u>	<u> </u>	
							 	(GRAV	EL. 3	Brow	n, some stor	es	<u> </u>	
								<u> </u>	20 to	<u>2-iv</u>	nch d	liameter, trac	÷		
<u>يا ر.</u>								~~~~	<u>silt.</u>	wet	<u> </u>				
Ę٩				104				<u> </u>	557	9'	10	IL'			
шh				18	1 1		14.0	TO T	10.5	<u>- 241</u>	NU F	IND GRAVEL			
F-10				-4	1			τ	prown +	<u>1005</u>	<u>e ; so</u>	t unt			<u> </u>
				<u> </u>	<u> </u>			ل 	ol gr	2- Incl	n dic	imeler. Wel			
LOCA	TION	SKETC	H		G	RANUL	DENS	ITY: COHE:	SIVE:	PROPOR	RTIONS:	REMARKS/WEATHE	R		
		<u> </u>			0-10	Ved	Loose	0-4 4-8	Soft	0-10%	Trace	60 F			
S S	e C	Ψla	$\lambda \mathcal{N}$		30-50	14e0	Dense	8-15	Stiff	20-35%	Some	Sunny			
i					>50	Very	Dense	19-30	very Stiff	35-50%	And	<u> </u>			

PRELIMINARY:

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C P P	LIENT ROJEC ROJEC	Lat T LOC	tar CATIC	ge N F	$\frac{N}{100}$	orth Aundsor 38	merio co	ca	BOREHOLE LOG	2
	NORT	H						DRILL	ER DRILLING ENGINEERS INC. DATE START 4/2	0/2007
-	EAST							RIG	CME 75 DATE FINISH 4/2e	12007
-	GRD	ELEV					···	BITS 8	3.25"H.S.A. FLUIDS - TOTAL DEPTH 15.	.3'
	TOC	ELEV.			<u></u>			LOGGI	ed by Charoen S. Water depth 4	
2 2	SAMP CT Cr SS Sj DC D Other	LE TY utting plit Sp ry Con T	PES: s poon re		Y N (YS Wash XX NX C S Contir	ore nuous S	ampler	SAMPLER SPECIFICATIONS: Length 2.5' O.D. 2" I.D. 1.7'' Other	
1	EPTH	BIT	SAM	9	SAMP	RECOV.	BLOWS	S SVI	SURFACE CONDITION: Grass	VIL VAPOR
100	(FT.)	CASING).] 	IYPE	FT/FT	per 6	- SIM	SOIL/ROCK DESCRIPTION BG	HS Core
2										
12120-1401	- 10 -			-+			3		10.5' to 11.0' NO RECOVERY	
	-11			-					Aurorad to 11/	
1111									11 of to 14 of Cutting CANID AND	
	-12								BRAVEL Brown come still	
1111									Wet	
	-15	8.25							SS 3 14' to 16'	
		1.51								
	-14	4,25		Ì		16"	10		14.0 to 153' SILTSTONE Given very	
	15					16"	20	"	stiff little clay little sand	
	-12	15.5	$\left - \right $				1 30/4	r'	s'lightly weather your moist	┤─┤──╸
					EN	DOF	BOREI	HOLE.		
	-16								END OF BORELINE	
	_17						}		Monitoring Well Installation	
	17				<u></u>	11	bac		2" PVC 10-foot screen	+
	10			ļ	em Co		Lug	>	MW-10	
		l		J	10U(rela	Da	31	casing + Lock	
	-19		De	n	onit	le chip	1 60	19	cap	
						'		7	Riser -3 to 3.7' concrete Oto 1.5	
	-70								screen 3.7 to 13.7' Bentonite chip 1.5 to 3	
							<u> </u>		Cap 13.7' to 14.' Filtersond 3' to 15.3'	
	LOCA	TION S	<u>sket</u>	<u>CH</u>				RANUL	DENSITY: PROPORTIONS: REMARKS/WEATHER	
	\sim		F	,			0-10	· · · · ·	Loose 0-4 Soft 0-10% Trace 60 F	
	2	e e	φ	10	\sim		30-5) Med D	Dense 4-8 Med Stiff 10-20% Little Summy Dense 8-15 Stiff 20-35% Some Summy	
							>50	Very	Dense 15-30 Very Stiff 35-50% And	

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CLIENI	Lat	iarg.	e No	orth A.	meric	a	BOREHOLE LOG	11			
PROJE	CT LOC CT NO.	ATION	-05	ndsor 38			Andy & Richard	BH NO PAGE OF	3		
NORT	'н					DRILLE	R DRILLING ENGINEERS INC.	date start 4 /	20/2007		
EAST						RIG	CME-75	DATE FINISH 4/20/2007			
GRD	ELEV.					BITS 8	25"H.S.A. FLUIDS	TOTAL DEPTH	17.3'		
тос	ELEV.		·			LOGGE	ed by Charoen S.	WATER DEPTH	91		
SAME	PLE TY	PES:					SAMPLER_SPECIFICATIONS:	cteel			
CT C	utting plit Sj	s Doon	7 1	¥S Wash ∛X NX C	ore		Length <u>2.5</u> 0.0 <u>2</u>	Material			
DC I Othe)ry Co r'	re	(CS Contir	nuous Sa	mpler	I.D	Other			
DEPTH	BIT	SAMP	SAMP	RECOV.	BLOWS		SURFACE CONDITION: Grass				
	CASING	NO.	TYPE	FT/FT	per 6"	SYM	SOIL/ROCK DESCRIP	TION	BG HS Core		
11500											
							. Avaered to 4'				
							0 to 4.0' SILT AND	CLAY. Dark			
							brown little	sound, trace			
						roots. Moist					
E Z	0.25										
E-3	0.00							*****			
<u>1111</u>	H.S.A						<u></u>	> 6'			
E-4					12						
<u>ulu</u>	1			18	12		4.0'TO 5.5' SAND AND) GIRAVEL.			
E-5	4.25			24"	17		brown med den	ise, some			
يبيليه	1.0.			29	20		trace stilt	-INCVI CICANERA			
E-6							55'to 6.0' NO RECO	VERY			
Lun s				ļ.			Augered to	q'			
E +							6.0' to 9.0' - Cutting -	SAND AND			
							GRAVEL. Brown	, some stone	3		
° Lini							up to 2-inch d	iameter trac.	e l		
Ę٩				,,	+		silt.				
ш <u>н</u>				18"	15		<u>852 9'ta</u>	<u>> "</u>			
F-10				24"			19 TO 10.5 SAND AND 6	SRAVEL. Brow	M		
							med dense, som	e stones up ti			
LOC	ATION	SKETC	H			PANIII	DENSITY: PROPORTIONS:	REMARKS/WEATHE	R		
-					0-10	NANOL	Loose 0-4 Soft 0-10% Trace	FOF SUV	nny		
S	el	Plo	~ 10		10-30 30-50	Med	Dense4-8MedStiff10-20%LittleDense8-15Stiff20-35%Some		/		
L					>50	Very	Dense 15-30 Very Stiff 35-50% And				

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C1 PI	LIENT ROJEC	Lat T LOC	à ro	e No	orth Annalsor,	neric co	a	BOREHOLE LOG					
PI F	ROJEC	T NO.	<u> </u>	-03	<u> </u>			$PAGE _ OF _ O$					
	NORTI	H					DRILL	LER DKILLING ENGINEEKS INC. DATE START 4/20/2007					
-	EAST		-				RIG	CIME +5 DATE FINISH 4/20/2007					
	GRD	ELEV		· ·			BITS	6.25 H.S. A. FLUIDS - TOTAL DEPTH (7.3)					
	TOC I	ELEV					LOGGI	ed by Charoen S. water depth 9					
<u> </u>	SAMP CT Ci SS Sj DC D Other	LE TY uttings plit Sp ry Col	PES: s coon re)] 	VS Wash NX NX Co CS Contin	ore Juous S	ampler	SAMPLER SPECIFICATIONS: Length $2.5'$ 0.D. $2''$ 1.D. $1.7''$ Other $$					
gli)EPTH	BIT	SAMP	SAMP	RECOV.	BLOWS	S SYM	SURFACE CONDITION: Grass Soil VAPOR					
	(FT)	CASING	NO.	TYPE	FT/FT	per 6		SOIL/ROCK DESCRIPTION BG HS Core					
LUMON VALUABO	-10					10 13		z. inch diameter, trace silt. Wet					
111	-11							Augered to 14-					
	10							11.0' to 14.0' - Cutting - SAND AND					
								GRAVEL. Brown, some stones					
	13	8 75						up to 2-inch diameter, trace					
		10.20 14.5A						silt. wet					
		1		ļ				SS 3 14' to 16'					
	217	110			20"	10		14.0'to 15.5' SAND AND GRAVEL.					
	-15	1.1.4				15		Brown med dense, little stones					
					24"	15		up to 2-inch diameter, trace					
	E16	[sitt. Wet					
	, interviewe	ł			16"	16	ļ	155 to 15.7' SILTSTONE. Grey					
	-17	17.	Ъ		164	59/4	4	stiff little sand moderately					
	<u> </u>	1	+	En	D OL	RADE	SUNT:	weathered wet					
	E-18			F		100K	ALE	-15.7 TO 16.0' IND RECOVERY					
	ي. بابا							Augered To 16.					
	E-19							554 10 1010 16 0 to 122' SUITSTONIE OF MON					
	E							otifi little and hand to					
	F-20							sint, inte somo, moderalely					
	L			<u> </u>	<u> </u>			weathered. Very moisi					
	LOCA	TION	SKET	CH			GRANU	DENSITY: PROPORTIONS: REMARKS/WEATHER					
		Col	- F	nav	\	0-10 10-3 30-5 >50	0 Me 30 Me 50 Ver	Loose D-4 Soft D-10% Trace FOF SUNNY led Dense 4-8 Mcd Stiff 10-20% Little Dense 8-15 Stiff 20-35% Some try Dense 15-30 Very Stiff 35-50% And					

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SNT Lacarde World Amer	BOREHOLE LOG	BH NO.
JECT NO. LF -0538		PAGE <u>3</u> OF <u>3</u>
orth	DRILLER DRILLING ENGINEERS INC.	DATE START 4/20/2007
AST	RIG CME 75	DATE FINISH 4. 20/2007
RD ELEV	BITS 8,25" H.S. A. FLUIDS -	TOTAL DEPTH 17.3'
OC ELEV.	LOCGED' BY Charoen S.	WATER DEPTH 9
AMPLE TYPES: T Cuttings WS Wash S Split Spoon NX NX Core IC Dry Core CS Continuous Other	SAMPLER SPECIFICATIONS: Length 2.5 O.D. $2''$ Sampler I.D. $3''$	Material <u>Steel</u> Liner <u> </u>
AND RECOVERIO	WS SUBFACE CONDITION: Grass	
FT) CASING NO. TYPE FT/FT per	6" SYM SOIL/ROCK DESCRIP	PTION BG HS Core
· · · · · · · · · · · · · · · · · · ·		
8.25 H.S.A 4.25 I.D.	END OF BOREH Monitoring Well 2° PVC 10-4 MW-11 Casing & Lock Cap Riser -3 to 5.7' Conce Screen 5.7'to 15.7' Ben Cap 15.7'to 15.7' Ben	DLE Installation oot screen rete o toz milechip 2 to 5 pr Sand 5 to 17.3
	Concrete 1 bag Bentonite chip Filter sound 4	z bags bags
See Plan	DENSITY: PROPORTIONS GRANULAR: COHESIVE: 1-10 Loose 0-30 Med Dense 4-8 Med Stiff 10-50 Dense 50 Very Dense 50 Very Dense 50 Very Dense 50 Very Dense	e 70F SUNNY

CLIENT	Lat	aro	e No	orth A.	meric	a	BOREHOLE LOG			
PROJEC PROJEC	T LOC T NO.	ATIOI	-05	ndsor 38	<u> </u>		Andy & Richard PAGE OF			
NORT	Н					DRILLER DRILLING ENGINEERS INC. DATE START 4/20/2007				
EAST						RIG	RIG CME-75 DATE FINISH 4/20/200			
GRD	ELEV.					BITS 8	3.25" H.S.A. FLUIDS TOTAL DEPTH 14.3'			
тос і	ELEV.					LOGGE	ed by Charoen S. WATER DEPTH 9'			
SAMP CT CT SS SI DC D Other	LE TY uttings plit Sp ry Cor	PES: s boon re	۲ ۲ ۱	VS Wash VX NX C CS Contir	ore iuous Sa	mpler	SAMPLER SPECIFICATIONS: Length 2.5 Material Steel Length 2" Liner			
DEPTH (FT.)	BIT CASING	SAMF NO.	SAMP TYPE	RECOV. FT/FT	BLOWS per 6	SYM	SURFACE CONDITION: Grass SOIL VAPA	OR One		
-0							Augurad to 1'			
1111							o to 4 0' - cutting - SILT AND CLAY			
							Brown, trace sand trace roots			
E - 7							Moist			
	8.25									
E-3	HSA									
	1.0.1						SS1 4' to 6'			
E-4				104	1		4.0 to 5.5' FINE SAND. Brown to			
L L L	4.25"			10	2		red brown, loose some silt,			
	1.D.		ł	24	2		little gravel. Moist			
E-6					4		5.5' to 6.0' NO RECOVERY			
							Augered To 4			
E-7							Brown to redbrown come sitt			
E O							little gravel. Moist			
0										
Eq			ļ				$\frac{\text{SS2 q' to u'}}{\text{SS2 q' to u'}}$			
				16	8		4.0' TO 10.3' MEDIUM SAND. Brown			
F-10				24	<u> </u>		mea dense some sill little			
							ginner, wer			
LOCA S	<u>tion s</u> QL	<u>P</u> I	n an	,,,,	G 0-10 10-30 30-50 >50	RANUL Med Very	DENSITY: PROPORTIONS: REMARKS/WEATHER AR: COHESIVE: Image: Cohesive:			

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BOREHOLE LOG

PROJECT LOCATION	Windsor,	CO	~	BOREHOLE LOG	BH NO. 12	
PROJECT NO. LF-	0538				PAGE OF	2
NORTH		1	DRILLE	R DRILLING ENGINEERS INC.	DATE START 4/20/2007	
EAST			RIG	CME 75	DATE FINISH 4/	20/2007
GRD ELEV	·····	1	BITS 8.	25"H.S.A. FLUIDS -	TOTAL DEPTH	F.3'
TOC ELEV	···		LOGGE	D BY Charoen S.	WATER DEPTH	२४
SAMPLE TYPES: CT Cuttings (SS) Split Spoon DC Dry Core Other:	WS Wash NX NX Cor CS Continu	re Ious Sar	mpler	SAMPLER SPECIFICATIONS: Length 0.D I.D7"	Material Stee Liner Other	
DEPTH BIT SAMP S	AMP RECOV	BLOWS	SYN	SURFACE CONDITION: Gras	S	SOIL VAPOR
(FT) CASING NO. 7	TYPE FT/FT	per 6"		SOIL/ROCK DESCRIF	TION	BG HS Core
-10 -11 -12 -13 8.25 H.S.A -14 4.25'' 14.2 1D -15 -16	, SS END OF	12 16 10 22 50/4 th BORE	HOLE	10.3' to 11.0' NO RE Augered to 11.0' to 13.0' Cutting SAND, Brown, 1:HLe gravel. N SS 3 13' 13.0' to 14.3' SILTSTO Very stiff, 1:HL, Claystone. Mox Weathered. Ver Augered to N END OF BOR	COVERY 13' MEDIUM some silt, NET to 15' NE Girey 2 sand, little lerately ry Moist. 4' EHOLE	
17 Sand Deston 18 Concre	4 bag ite zba ite Iba	ء آ2 ک		MONITORING WELL 2" PVC 8-foot MW-12 Casing & Lock Cap Riser -3 to 5.7' Conc screen 5.7' to 13.7' Bente Cap 13.7'- 14' Filte	INSTALLATI screen rete ot nite chip 2' r sound 5' to	6N 0 Z 10 S 14.3'
				·		
LOCATION SKETCH		1	<u> </u>	DENSITY DEODORTIONO	DEMARKO /WEAMIL	
See Pla	λή	G1 0-10 10-30 30-50 >50	RANUL Med Very	DENSIT I: PROPORTIONS: AR: COHESIVE: Loose 0-4 Dense 4-8 Med Stiff 10-20% Little 20-35% Dense 15-30 Very Stiff 35-50%	707 Sun	<u>~</u>

LOG STATUS:



APPENDIX G-2 WATER LEVEL ELEVATION TIME-SERIES GRAPHS (HYDROGRAPHS) PARSONS MINE MONITORING WELLS




























APPENDIX G-3 SAMPLE COLLECTION PROTOCOLS

ATTACHMENT G-3: GROUNDWATER MONITORING AND SAMPLE COLLECTION PROCEDURES

1.1 SCOPE AND APPLICATION

The purpose of this Standard Operating Procedure (SOP) is to provide guidance for determining the depth to water in a well using an electronic water level indicator. In this SOP, wells are defined as monitoring wells, piezometers, temporary well points, and potable wells. Permanent wells should be surveyed such that wells can be located and water elevations can be determined. At sites where there are multiple wells, a complete round of water level measurements should be collected site-wide prior to commencement of activities that will affect groundwater levels.

A permanent survey mark should be placed on the top of the well casing (TOC) as a reference point for groundwater level measurements. If the lip of the riser pipe/well casing is not flat, a notch can be made on the polyvinyl chloride (PVC) riser and used as the reference point. Alternatively, the reference point may be located on the top of the outer protective casing (if present). If using a measurement reference point, it must be documented in a site-specific logbook or on a field data sheet. All field personnel must be informed of the measurement reference point used to ensure the collection of consistent data.

1.2 WATER-LEVEL MONITORING

An electronic water-level indicator is used to measure the depth to water in each well. The indicator consists of a wired cable with a probe at the end. When the probe contacts water, the water completes a circuit causing the indicator to emit a sound at the surface. The water-level indicator should be turned on, then lowered until the probe emits a tone indicating contact with water. The distance from the water surface to the TOC should then be recorded using the gradational scale on the cable. The water level measurement should be recorded on a water-level monitoring field form or notebook, then the measurement should be repeated to confirm the reading. All measurements should be recorded to one hundredth (0.01) of a foot. It is important to record the date and time of each measurement along with the well identification and the depth-to-water value since water levels can vary over time. Water level measuring equipment will be cleaned of visible water and particulate matter prior to and after use at each measuring location via wiping/rinsing.

The groundwater elevation can then calculated by subtracting the depth-to-water measurement from the surveyed TOC elevation.

1.3 WATER QUALITY SAMPLE COLLECTION

The procedure for collecting a water quality sample involves the use of a pump or bailer to remove three wellvolumes of water from the well to ensure that the water remaining is representative of aquifer water, then to use the pump or bailer to pass samples of water through a filter to remove suspended particles and collect the filtered sample in a bottle.

1.3.1 Well Purging

An adequate purge is normally achieved using this method by removing three well volumes of standing groundwater at relatively high flow rates prior to sampling while recording the pumping rate, discharge volume, water level and routine groundwater parameters over time. Routine groundwater parameters should include temperature, pH, and specific electrical conductance at a minimum, but may additionally include turbidity. It is

assumed that stabilization of the groundwater measurements indicates the purge water is representative of ambient water from the underlying aquifer. Groundwater quality parameters are generally considered stabilized after three consecutive sets of readings do not vary by more than 10 percent (%), however the criteria for sample collection will be based on purge volume, rather than parameter stability. The time between readings (typically 5 to 10 minutes) should be chosen to ensure enough data have been collected to document the stability of parameters. If the calculated purge volume is large, measurements taken every 15 minutes may be adequate.

To calculate the volume of a well, use the following equation:

Well Volume (gallons) = πr2hk

where:

 $\pi = 3.14$

r = radius of monitor well (feet)

h = height of the water column (feet). (This may be determined by subtracting the:

depth to water from the total depth of the well as measured from the same

reference point).

k = conversion factor, 7.48 gallons per cubic foot (gal/ft3)

The volume, in gallons per linear foot, for various standard monitoring well diameters (nominal):

Well diameter (inches)	<u>2</u>	<u>3</u>	<u>4</u>
Volume (gal/ft.)	0.1631	0.3670	0.6528

1.3.2 Sample Preservation and Containers

Groundwater samples will be collected in bottles which are chosen to be appropriate for the analysis by an analytical laboratory, and may be supplied directly by the laboratory. The analytical method specifies the type of bottle, preservative, holding time and filtering requirements for a groundwater sample. Samples should be collected, when possible, directly from the sampling device into appropriate sample containers, with an appropriate sample identification label. Record all pertinent data in a site-specific logbook and on a laboratory-supplied chain of custody (COC) record.

The samples should be placed in a cooler and maintained at less than or equal (\leq) to 4 degrees Celsius (C) and protected from sunlight. Ideally, samples should be transported to the analytical laboratory within 24 hours of collection. If large numbers of samples are being collected, shipments may occur on a regular basis after consulting the analytical laboratory. In all circumstances, samples need to be analyzed before the holding time expires.

1.3.3 Sample Collection

After purging, groundwater samples may be collected using a bailer or the flow-stream from the pump. Samples collected for dissolved metals analysis require filtration. Groundwater is primarily filtered to exclude silt and other particulates from the samples that would interfere with the laboratory analysis. In-line filters (typically 0.45-micron) are used specifically for the preparation of groundwater samples for dissolved metals analysis, and for filtering large volumes of turbid groundwater. An in-line filter can be used with a peristaltic pump to transfer the sample from the original sample bottle, through the filter, and into a new sample container. The filter must be replaced between sampling locations.

The filters used in groundwater sampling are self-contained and disposable. Disposable filters are preferred and often used to reduce cross-contamination of groundwater samples. Disposable filter chambers are constructed of polypropylene material, with an inert filtering material within the housing.

The proper collection of a sample for VOC analysis requires minimal disturbance of the sample to limit volatilization. The following procedures are required to be used:

1. Open the vial, set cap in a clean place, and collect the sample. When collecting duplicate samples; collect both samples at the same time.

2. Fill the vial to almost overflowing. Do not rinse the vial, or let it excessively overflow. It needs to have a convex meniscus on the top of the vial before securing the cap.

3. Check that the cap has not been contaminated and place the cap directly over the top and screw down firmly. Do not over tighten the cap.

4. Invert the vial and tap gently. Observe vial for at least 10 seconds. If an air bubble appears, unscrew the cap and pop the bubble or refill with more sample then re-seal. Do not collect a sample with air trapped in the vial.

5. The holding time for unpreserved samples to be analyzed for VOCs is 7 or 14 days for preserved samples. Samples should be shipped or delivered to the laboratory as fast as practical in order to allow the laboratory time to analyze the samples within the holding time. Ensure that the samples are stored at \leq 4 degrees C during transport but do not allow them to freeze.

1.3.3.1 Bailer Purging

Wells are typically purged using either pumps or bailing. Bailing is a process in which a plastic disposal bottom loading bailer with a string or thin rope attached is lowered by hand into a well, allowed to fill with water, and then retrieved. Once retrieved the water in the bailer is decanted into containers on the ground surface for subsequent disposal.

Manual bailing, or the use of dedicated or disposable bottom loading drop bailer approximating 3 feet in length and one liter storage capacity, attached by a string or rope to remove water from a small diameter well for well development and/or sampling is performed as follows:

• Open the well protector top, typically removing the protective lock and/or unbolting the cover, to access the well riser piping.

• Affix the bailer to the rope, string, or cord with a knotting technique that will ensure its permanent attachment and prevent bailer loss over the course of the purging cycle. Knots can loosen or slip when the rope becomes wet in conjunction with the application of the additional weight of the full bailer.

• Place the bailer in the well and lower it to the water table surface, slowly allowing the bailer to sink and fill with water (this avoids turbulent flow of water in the wells casing and minimizes off gassing).

• Retrieve the bailer by manually pulling the attached rope by either coiling it hand over hand or allowing it to collect onto the plastic sheeting on the ground until the bailer exits the well riser. Then grasp the bailer and decant the purge water into a bucket or other interim container. This procedure is repeated until the prescribed volume of water has been purged from the well.

1.3.3.2 Mechanical Pump Purging

Small diameter electric submersible pumps may be employed for some circumstances. Comparatively high volume pumps, such as a "Whale" or "Keck" model/brand employ a 12v battery or rechargeable power source may be used individually or in series to accommodate deep pumping situations or increase pumping volume.

Although this document does not provide a specific description for the use of each type of pump, the application and field use of a small diameter 12v pump such as a "Whale Pump" or equivalent is as follows:

• Measure the overall well depth and construct the pump with supply tubing "string" accordingly, allowing extra tubing length as necessary to accommodate discharge to storage and/or sampling containers. The electrical wire supply line should be of adequate gauge and constructed to a length sufficient to access a nearby power source. Multiple "in-line" pumps may be used in accordance with manufacturers suggested recommendations to facilitate an adequate pumping rate and volume in deep wells.

• Lower the supply tubing with attached pump(s) in the well to the desired depth, commonly near the well bottom or lower level of the screened interval. The pumping "string" can be affixed to a permanent object, typically the riser protective piping, with a small clamp to keep the pumps from contacting the bottom of the well or maintain a desired or prescribed sampling depth.

• Attached the electrical supply wires employing small clamps on the positive (+) and negative (-) battery terminal in the event a standard 12v automobile battery is utilized as power source or insert the plug to the cigarette plugin if wired accordingly. There will be a short delay until the pumps engage and flow is actuated if wired correctly and the power source is adequate.

• As water flows from the supply tubing, place the purged water into an interim storage container, commonly a five-gallon bucket, for transport to a long term storage or staging area pending disposal analysis. The direct discharge of purged water may be warranted based on historical site findings or client direction.

• Continue with the pumping/storage/disposal routine until the desired or prescribed volume of water has been removed.

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