PEAK
CONSTRUCTION GROUP

May 8, 2017

Mr. Kevin Carpenter, P. E.
Senior Environmental Engineer, Remedial Bureau C,
Division of Environmental Remediation
New York State Department of Environmental Conservation
625 Broadway
Albany, New York 12233-7014

RE: Rapid Impact Compaction, Micropile & Foundation - Scope of Work for Environmental Considerations
109 Marbledale Road
Tuckahoe, New York 10707
BCP Site No. C360143

Dear Mr. Carpenter:

As requested by the Village of Tuckahoe (the Village) environmental consultant HDR and the New York State Department of Environmental Conservation (NYSDEC), the ownership and construction teams have compiled the following Scope of Work detailing the methods and approach for micro piles, compaction and foundations. It is understood that this scope provides focus on the environmental considerations during the foundation and non-landscaped areas temporary cover system installation work in the parking lot areas, which is the initial layer of the permanent cap (i.e. non-soil temporary cover system) in accordance with the RAWP and prior Scopes of Work that have been submitted and approved for this project (e.g., Source Area scope; Grading Scope; Micropile Pilot Scope). Further, work to be completed under the aforementioned prior scopes will be coordinated with the foundation and non-soil temporary cover system installation activities described below. For instance, test pits need to be completed, and foundation work in proximity to these areas must be appropriately coordinated.

It should be noted that the NYSDEC and HDR comments that have been reviewed and incorporated into this scope only pertain to the environmental aspects of the micropile installation and rapid impact compaction (RIC) activities included herein. NYSDEC and HDR comments do not address any engineering and/or design assessment or final foundation design for the proposed micropile or RIC programs, in terms of structural stability, site compaction requirements to support future uses, existing building assessments (vibro- or seismic analyses), etc. It is understood that the Village has retained a separate entity to review and comment on the engineering and design aspects of the foundation and RIC components for the project.

It is understood that the full scale micropile and RIC work cannot proceed without a Village Building Permit. As the below scope includes two separate components that are associated with foundation work at the future hotel and restaurant buildings (micropiles) and compaction of site areas to accommodate parking, utilities, and landscaped areas (RIC), it may be possible for the Village Building Department to issue a permit for one of these components (if not both at the same time). The groundwater and vapor monitoring and geophysical surveys that are included in this scope can be initiated in the short term.

Contractors:

The following contactors are responsible for the work:

Micro Pile Contractor:

Scott Bendersky
Environmental Bulkheading Corp. (EBC)
PO Box 0460
Brightwaters, NY 11718-0460
Tel (516) 361-5626
Fax (631) 665-9369
ebccorp@hotmail.com

Foundation Contractor:

Amir Daibes, PE
Pyramid Construction & Engineering (Pyramid)
3 Hubbardton Road
Wayne, NJ
Tel (973) 305-0004
Cell (973) 906-1917
Fax (973) 305-0010
www.PyramidCE.com

Rapid Impact Compaction Contractor:

Keithe Merl, PE
GeoStructures, Inc.
38 Gallant Fox Lane
Egg Harbor Twp., NJ 08234
862-754-0438
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Geotechnical Engineer:

Carlin Simpson
Bob Simpson, P.E.
61 Main Street
Sayreville, NJ 08872
732-432-5757
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Vibration Analysis Firm:

Vibranalysis Inc.
Corey Rossman / VP of Estimating
79 Alexander Ave. Bronx, NY, 10454
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coreyr@vibranalysisinc.com

EBC will be installing the micropiles. EBC is a full-service contractor, located in the tri-state area, specializing in the construction and repair of deep foundation systems. They specialize in the installation of piles, sheeting and shoring, excavation, tie-backs and anchors for both new and existing construction, as well as the repair of existing foundations. They have become the contractor of choice when projects include any pile foundation work.

The company is NYC Vendex approved and have worked with the Department of Sanitation, NYSDEC, many local municipalities, New York State Department of Parks, Office of Emergency Services, as well as the New York Housing Authority and Urban Development. Their company is also a preferred contractor with any project near or adjacent to sensitive structures which can be impacted by vibrations such as the NYC MTA structures. Their qualifications and insurance naming the Village as additional insured were provided on 2-24-2017.

Pyramid Construction & Engineering specializes in commercial construction in the tristate area. The company has over 19 years of experience in all types of masonry and concrete work including but not limited to:

- Thin Brick, Face Brick Veneer, and Stone Veneer
- Concrete Masonry Units including smooth, rough, and split-face block
- Custom Stonework
- EIFS and Stucco
- Waterproofing and Exterior Insulation
- Light Steel- Stud Framing
- Concrete footings and foundations

Pyramid is specifically experienced in concrete footings, piers, foundation walls, and slabs. Pyramid Construction & Engineering understands that all trade components, including shop drawings, reinforcing steel, concrete specifications, placement and finishes must be completed with perfect detail. The company assumes full responsibility for the proper completion of the concrete work in accordance with project drawings

Their qualifications and insurance naming the Village as additional insured were provided on 02-24-2017. This company's respective HAZWOPER trained individual's certificate was also provided.

Established in 1995, GeoStructures consists of geotechnical and structural engineers that provide marketing and design services in support of its sister company GeoConstructors (established in 1997). GeoConstructors provides design-build construction services for ground improvement, (Aggregate Piers, Geopier, Impact Pier Displacement Piers, GeoConcrete Columns, Rigid Inclusions, Ductile Iron Piles & Rapid Impact Compaction), structures-walls These technologies are used to solve customer problems ranging from settlement control of building, tank and MSE wall foundations, liquefaction mitigation, and support of load transfer platforms, to landslide corrections for shallow and deep seated slope failures, and creating economical grade separation options with steepened slopes.

By providing design-build services under one roof, clients have been receiving the seamless experience of customized design-build services for their Brownfield, Commercial, Industrial, Residential, and Transportation projects for the last 20 years.

Their qualifications and insurance naming the Village as additional insured and the respective HAZWOPER trained individual's certificates were provided to the Village on April 27, 2017.

The above-noted companies have been made aware of the site conditions and the contaminants of concern at the site. Each has been provided with the recent environmental reports (including sampling data results and geological logs) from the site and the HASPs that are in place. It is the responsibility of each company to develop its own HASP, and each company is responsible for the health and safety of its employees. Each company has the appropriate OSHA 40 hour HAZWOPER trained individual.

Micropile Pilot Test:

Before commencing the pile installation work, Environmental Bulkheading Corp. (EBC) completed a pilot test, which involved the installation of 10 piles using two different techniques. This work was completed in order to determine which of the two methodologies was preferred from both an installation and environmental management perspective to handle spoils created from the drilling.

The pilot test was performed in early April 2017. EBC mobilized an air rotary rig to the Site to implement the pilot test. There is a fact sheet on the M9-1 hydraulic crawler drill attached to this Scope of Work.

The pilot test demonstrated that the mud/water rotary drill method for pile installation was preferred because installation occurred without any major interruptions and the water spoils generated were minor in volume. During the pilot testing, HES was on-site to monitor the drilling and possible effects of the micropile installations to the surrounding soil vapor. As part of the pilot testing, soil vapors were monitored in four existing monitoring wells (MW-4, MW-5, MW-6 and SVE-1). Field observations confirmed that soil cuttings generated by this drilling method were minimal, typically less than 1 cubic yard of cuttings were generated per pile. Additionally, the sumps that were constructed on-site using 8-foot diameter pre-cast concrete drainage rings lined with plastic sheeting were effective at collecting drilling fluids and using them for recirculation in the micropile installation process. Based on these results, none of the drilling fluid excess needed to be containerized for later off-site disposal. It is anticipated that moving forward with the micropile installation that drilling fluid generation will not be a problem. The pilot test soil vapor monitoring results are summarized on Table 1 included at the end of this letter.

Carlin Simpson reviewed the pilot test results and determined that additional borings were needed to evaluate the competency of the bedrock into which the piles were being installed. These additional borings were performed in mid-April 2017. These additional borings demonstrated the competency of the rock.

As with all prior work on the site, CAMP and other vapor monitoring with the FID, PID and four gas meter were performed. PID and FID readings (pre-pilot and post-pilot) are summarized on Table 1. Soil vapor monitoring during the micropile pilot test did not reveal any sustained significant changes in soil vapor concentrations at the four monitoring locations.

During micropile installation, EBC installed a large polyethylene lined sump pit using 8-foot diameter pre-cast concrete drainage rings set in ¾-inch crushed. Drilling fluids that were pushed up out of the borehole during mud rotary drilling flowed overland on top of plastic sheeting to the recirculation sump pit. A suction pump placed in the recirculation sump pumped the collected water back down the borehole to remove drill cuttings from the hole. A detail of the drilling operation and the recirculation technology employed during the micropile pilot test is included on Figure 1 at the end of this Work Plan.

Carlin Simpson will submit logs for the pilot test to the Building Department upon request.

Micropiles – Full Scale

Based on the findings of the above-described pilot test, the preferred method for micropiling was determined to be the mud/rotary drilling method. Pile and foundations will be installed per Structural Plans prepared by the project's structural engineer Grossfield Macri Consulting Engineers, PC dated 02/03/2017, which is attached hereto. Approximately 198 micropiles will be installed in the hotel building footprint pursuant to the attached plan. Since these piles are narrow and will be drilled into the site, the nature of this site work is similar to the installation of the deep borings and installations that have been installed on the site to date during the environmental investigation. This was confirmed during the Micropile Pilot Test described above. The micropiles will be drilled down to bedrock to secure the hotel structure.

The casings of the micropiles are advanced as piles are drilled into site's bedrock. Drill pipe is removed, which leaves casing for micropiles setting in bedrock. A reinforcement load bar is lowered into casings of the micropiles, for added capacity. Cementitious grout is pumped or pressure fed into the micropiles casings, bottom up. The casings for the mini piles are lifted to top of bedrock, allows bonding to the bar. Excess steel is cut from the tops of micropiles. Piles are capped to engineer's design. A select number of piles are load tested to prove the engineering load design.

The outer casing is permanent. Large obstructions are not an issue with this drilling method since the drills can bore through obstructions. The rock hammer goes into the bedrock 5 feet. Spoils that are generated are managed as described below after being brought to the surface by either the compressed air or water method. On this site, the air method produced more water and soil spoils than the water method. Dust control measures will be followed. Dust is not allowed to leave the site, and will be monitored pursuant to the CAMP. The pile submittal document attached hereto provides additional details on the casing, rock hammer, reinforced rod socket, grouting from the bottom up using a tremie pipe, cleaning spoils from the casing, etc.

Micropile drilling activities for the hotel will not be within 20 ft. of the property lines. It is possible that pile drilling for the restaurant will be within 20 ft. of the property lines. If it will be, the CAMP monitoring requirements for working within 20 ft. of a property line will be implemented.

Schedule:

The project site is currently ready to begin pile and foundation work. Soils from all source areas have now been removed; pending DEC Comments, minimal if any remaining source area remediation may be expected as of the date of this scope. The only Source Area in the footprint of the hotel is Source Area 2. Based on end-point sampling results at this location, additional soil excavation was requested by the NYSDEC and recently completed. The additional excavation was related to the presence of metals and PAHs in excess of CSCOs (Track 4 Soil Cleanup Guidelines). The expected duration is 6 to 8 weeks total for pile installation and 8 to 10 weeks for pile cap and foundation installation(no intrusive work is anticipated during the latter). It is expected that EBC will complete two column lines in a one week period on the South end and 6 column lines per week on the North end. The attached drawing shows the schedule and sequencing of this work from the south end

of the building to the North. Therefore, the anticipated Schedule for the micropile work (See Pile & Pile Cap Work Flow Diagram) is as follows:

Week 1: Install test piles - COMPLETED
Week 2: Install piles at column lines (CL) 1-2
Week 3: Install piles at CL 3-4
Week 4: Install piles at CL 5-6; Install pile caps at CL 1-2
Week 5: Install piles at CL 7-8; Install pile caps at CL 3-4; Install grade beams at CL 1-2
Week 6: Install piles at CL 9-14; Install pile caps at CL 5-7; Install grade beams at CL 3-4
Week 7: Install piles at CL 15-20; Install pile caps at CL 8-14; Install grade beams at CL 5-6
Week 8: Install pile caps at CL 14-20; Install grade beams at CL 7-8
Week 9: Install grade beams at CL 9-14
Week 10: Install grade beams at CL 9-14
Week 11: Install grade beams at CL 15-20
Week 12: Install grade beams at CL 15-20

Sequencing:

As noted above, following the micropile pilot test, the anticipated work flow is to have the micropile contractor commence at the Southernmost end of the building footprint (column line 1) and advance to the North (column line 20). As noted on the attached pile plan, after micropiles are installed, then subsequently the pile cap and foundation installation will follow. The sequencing of this work is shown on the attached Plan.

The Rapid Impact Compaction Work:

Rapid impact compaction (RIC) is a process by where dynamic energy is imparted by a weight dropping from a controlled height onto a patented foot. Energy is transferred to the ground safely and efficiently as the RIC's foot remains in contact with the ground. No flying debris is ejected. RIC densifies loose fill soils. The benefit from the rapid compaction is it increases the bearing capacity of the soil, minimizes settlement and provides uniform support for structures. This work will be conducted per the Carlin, Simpson & Associates: Ground Improvement Plan dated November 30, 2016, which is attached hereto. This technique is primarily utilized at the areas outside of the building footprints to include some utilities and parking lots.

Overexcavation that is planned for specific utility corridors and other parts of the site (as shown on the November 30, 2016 Plan) will be conducted pursuant to the approved Grading Scope (and to the Source Area scope, should source material be encountered in these areas). The appropriate CAMP will be implemented during RIC and over-excavation work. All materials will be appropriately handled, separated, stockpiled for reuse, and/or disposed of off-site in accordance with the RAWP and the previously approved scopes.

RIC will be sequenced to not interfere with the other on site activities. Total duration is expected to be 10-15 working days. The RIC contractor will start work in the North and progress in a Southerly direction. A primary objective is to establish a stone cover (temporary cap) over significant portions of the site immediately following grading and RIC work. Materials proposed for on-site importation and use have been reviewed/approved (or will be reviewed and approved) by NYSDEC.

As noted above, provisions will be taken to appropriately coordinate the foundation and RIC work, and subsequent cap installation with required site work described in prior approved scopes of work (Grading, Source Areas). As described further below, appropriate air monitoring, including the CAMP; source material separation, staging, and disposal (if encountered); spoils handling; dust and odor suppression; and material staging will be conducted in accordance with the RAWP and other approved scope documents.

It is understood that the Village Building Department may provide specific comments with regards to other aspects of the Micropile and RIC work that include but that are not necessarily limited to noise, vibration, property assessment, foundation design, and structural analysis.

Micropile Drilling Technique and Spoils Handling Methodology:

The hotel building footprint will be graded to "bottom of pile cap" elv. 133.92'. EBC will utilize two drilling rigs. The drilling rigs will include an M9-1 hydraulic crawler drill and an HD180 hydraulic crawler drill. One will commence in the SW corner and one will commence in the SE corner of the building footprint and will continue to advance Northward. The rigs will advance based on daily logistics requirements. The first 10 piles installed during the Pilot Test will be non-sacrificial test piles as per the load test plans. All piles will be logged, inspected by and surveyed as per requirements of the engineer of record Carlin Simpson.

For the restaurant building footprint, it will be graded to accommodate finished floor height of elv. 152.0. EBC will utilize one drilling rig. Micropile installation methods will comply with this scope of work. The CAMP for work within 20 feet of the property boundary will apply.

As noted above, two drilling methods may be utilized – the Air rotary drilling methodology and the Mud/Water Rotary drilling method. The mud/rotary drilling method was selected as the preferred method after the pilot test, but given the nature of the Site, both methods may be required during the installation of all 198 hotel piles.

Air Rotary Drilling:

When drilling with air through the overburden, soil spoils come out and pile up around the clamps at the front end of the drill where the pipe is being rotated from the drill head. EBC utilizes duplex drilling adapters that allow the sedimentation/cuttings to drop vertically from the opening at the drilling head around the front end of the mast where the pile is being rotated. The soil cuttings drop and form a mound of sedimentation around the pipe being installed. It is estimated that roughly 0.6 cubic yards of spoils will be generated per pile but this will
vary depending on depth. The mounded soils will be inspected by HES for any signs of contamination and vapor levels will be screened using the calibrated on-site PID and FID meters. In addition, a 4-Gas meter will be used to monitor %LEL concentration, which is often an indicator of methane gas if present. Periodic screening with the PID, FID and 4-Gas meters will be routinely conducted at the top of pile boreholes (as was done during the boring and monitoring well installation), and the headspace in nearby monitoring wells and vapor points by HES personnel. Since there are roughly 198 piles for the hotel, the total spoils from this method if employed would be roughly 119 cubic yards.

The closest wells with screen that extends above the static water level (MWs 1, 3, 4, 5, 7, 9, OW 2 and SVE 1) will also be monitored using the field instruments to enable detection of any significant changes in the soil vapor concentrations during the pilot pile installations. A set of baseline readings will be made prior to the start of work.

To control fugitive dust (and other spoils) that may be formed at each of the drilling locations, EBC will mobilize tarps (at ground surface and possibly as a curtain at the back end of the drilling operation), containers, and a diffuser/hosing to allow dust to be controlled and diverted into containers for future waste handling and disposal. Siteworks' water truck or possibly a water misting system may be employed if needed to further control dusts generated near the bore hole. CAMP monitoring will also be implemented during all drilling activities.

When the casing is seated into competent rock and no longer in questionable soft overburden material, the cuttings generated are in the form of a dusty and fragmented pebble mixture. During this phase of the drilling, the dust contingency plan will be implemented to the extent there is any visible dust being generated. Water, and if required, foam will be used to suppress dust.

This drilling technique is more vulnerable to steel structures or other obstructions that will cause the drill rig to hesitate and grind. To the extent this occurs, work will cease on this particular pile and the drill rig will move to another location until this pile location is investigated. A backhoe will be used to perform the investigation to determine if there are any steel obstructions (tank or other steel structures) in the path of this particular pile installation down to 20 feet. If a tank or any other steel vessel that may contain contaminants is encountered during this investigation, excavation of that source material will occur before additional drilling proceeds. Soils removed will be screened under the procedures laid out in the RAWP (and prior approved scopes) to determine if soils are to be reused on-site or appropriately handled, stockpiled, and disposed of off-site.

During the pilot test, the contractor evaluated whether steel structures or other obstructions on the site were present and that would cause the drill rig to hesitate and grind. It was determined that no steel or metallic obstructions were encountered and drilling operations were not disrupted. This method will only be used in the event the mud/water rotary method described below cannot be used.

Mud/Water Rotary Drilling:

Water drilling is typically used on sites with significant obstructions because it is the preferred method for drilling through obstructions. However, even using this methodology, a good drill operator can detect when a significant obstruction is being encountered with the drilling rig.

When drilling with water and/or using water as the drilling fluid in order to extract the cuttings, a different process is utilized to capture the spoils. Similar duplex heads are used as water and cuttings flow out the top of the drill head and drop down to the drill clamps and surrounding pile installation area. Sometimes, when this technique is used, the spoils fan out more due to the water runoff. However, during the pilot test, few spoils were generated. Since this technique is preferable, and since little water spoils were generated during the pilot test, this method will be primarily used on-site to install the micropiles. In fact, during the pilot test, such a

small amount of water spoils was generated, the spoils could not be readily captured. To the extent any pile generates a sufficient amount of water, spoils that can be captured, and this water will be directed towards one or more containment ponds and or drainage structure where the waste water spoils will collect. See Figure 1. This water will then be recycled to a holding tank and re-pressurized through the drill as the drilling cycle continues. Originally, the team thought that 2000-4000 gallons of water would be withdrawn from the fire hydrant per day, which would be predominantly recirculated back into the process. The current estimate is down to 300-500 gallons per day, but this could fluctuate wildly based on ground conditions. This gives EBC the ability to limit the amount of water needed on a daily basis and allows for the collection and recycling of the majority of the cuttings in a central area.

As illustrated on Figure 1, water capture and recycling will occur as follows: There will be a minimum of 2 sump pits (but more if needed). Berms will be used to divert / channel water to pits if needed. There will be a layer of plastic placed and maintained on the ground at the drilling area. The process will be monitored and maintained by EBC and Siteworks.

The pits will be created with double blue tarp and additional polyethylene sheeting which will overlie a rip rap base. The pits will be tested prior to drilling startup to ensure water is held for re-circulation in accordance with NYSDEC regulations.

Since the sump pits will be centrally located, the goal will be to leave them in place throughout the pile drilling or as long as the blue plastic tarp liner system is sound. When the tarps are no longer performing their function of containing the water, they will be disposed of as regular refuse. The sump pits will be abandoned using suitable fill generated from an acceptable area on-site.

A hydrant permit has been obtained from Suez USA, Inc., the local water company, for the use of the fire hydrant. As part of the hydrant permit, a flow meter was obtained from Suez and costs associated with the water used will be paid directly to Suez.

Since it is anticipated that EBC will be drilling at a lower grade in the building envelope than the rest of the site, all spoils shall be contained within the piling area, captured and disposed of if the spoils exhibits evidence of contamination. Water will be managed per the NYSDEC DER/DOW MOU, DER-10, and applicable regulations. The plan will be to handle any contaminated materials in the same manner as all site contaminated materials have been addressed pursuant to the RAWP. An estimated 5 to 10 gallons of excess grout will be created per pile. Hardened grout will be properly disposed of.

To the extent obstructions are encountered during this drilling technique, as with the air drilling technique, work will cease on this particular pile and the drill rig will move to another location until this pile location is investigated. A backhoe will be used to perform the investigation to determine if there are any steel tank or other steel structures in the path of this particular pile installation down to 20 feet. If a tank or any other steel vessel that may contain contaminants is encountered during this investigation, excavation of that source material will occur before additional drilling proceeds in this area. Soils removed will be screened under the procedures laid out in the RAWP (and prior approved scopes) to determine if soils are to be reused on-site or appropriately handled, stockpiled, and disposed of off-site.

Should micropile installation and/or the recirculation of drilling waters become problematic (i.e., the procedures described above cannot be maintained) or are found to not be in accordance with the applicable

NYSDEC regulations), excess waters may need to be containerized on-site for future handling. Containerized waters may require sampling, pre-treatment or disposal.

The concrete foundation installation is considered to be non-intrusive work as it will occur on top of the graded building pad with no additional excavation being required.

Preliminary Work and Environmental Compliance and Contingency Plans During the Work:

I. Preliminary Work

A. Preliminary Geophysical Ground Penetrating Radar Survey Work:

Because significant amounts of metal debris were reported to have been disposed in this landfill, it was believed that meaningful data could not be obtained using geophysical investigation methods to detect potential tanks, nests of drums or other source areas. Since the approval of the Remedial Action Work Plan in July 2016, significant excavation and grading work has been completed in the upper 15 feet of the site. Approximately double the initial estimated volume targeted for excavation and off-site disposal has been excavated since excavation of the source areas began in February. Significant additional excavation has occurred for the purpose of changing the surface elevations at the site and for installation of temporary or permanent Stormwater management structures.

Throughout all of this excavation, far less metal debris was found than originally anticipated. On a volume basis, only approximately 1% of the excavated material has been debris, which included metal. Additionally, two underground storage tanks and a large cache of Freon-containing aerosol cans were discovered. Based on the above new information, the NYSDEC now feels that it may be possible to collect meaningful data using geophysical methods focused on the upper 20 feet of the landfill. Since the upcoming work includes planned ground improvement utilizing rapid impact compaction (RIC) to densify the soil to minimize settlement over a large portion of the site, and RIC can impart energy to the top 20 feet of soil, out of an abundance of caution, the DEC has determined that it is advisable to utilize geophysical methods in the areas targeted for compaction in order to determine if any tanks or nests of drums or other potential contaminant sources are present in the affected zone prior to compacting the soil.

A geophysical survey was performed on April 19th, 2017 by a qualified geophysical consultant (Hager Richter Geoescience) using ground penetrating radar (GPR) prior to RIC work. A GPR survey included a means of scanning the subsurface in the target compaction areas to determine if there is a potential for tanks, drums or other concentrated sources, which could be removed prior to compaction. The preliminary results did show numerous anomalies but not indicate any apparent large metal obstructions such as tanks. If the final report shows any significant anomalies, they will be investigated via excavation. A test pit will be performed where any significant anomalies are present in the survey. The anomalies will be plotted on a scaled site plan and located on the site for later investigation. The significant anomalies will be located on-site and HES personnel will direct Siteworks to excavate the areas of concern so that they may be inspected for potential hazards including buried tanks or drums.

B. Preliminary Groundwater Monitoring:

A new round of samples from OW-1, BW-1, OW-2, BW-2, OW-3, BW-3, and MW-8 shall be implemented prior to full scale RIC work and Micropile installation in order to develop baseline data. This is currently schedule to occur the first week of May 2017. Additional sampling of groundwater will also occur during full scale work and after remedy completion. A more detailed description about the groundwater monitoring work is described below.

C. Vapor Sampling (Summas):

Vapor sampling using summas canisters shall also be implemented prior to full scale RIC work and Micropiles installation. This will also occur the first and second week of May. Additional vapor sampling will also be implement during full scale work. Figure 2 provides the proposed new vapor sampling points which were selected based on the planned RIC and micropile work. Subsequent rounds of vapor sampling will be planned during the course of RIC and micropile work, based on NYSDEC discussions. It is noted that additional (real time) vapor monitoring will also be implemented during the full scale work (see below)

Based on the level of vapor beneath the site and the vapor levels documented off-site by the NYSDEC, and to monitor for changes in soil vapor concentrations during drilling and compaction, soil vapor sampling and monitoring systems have been designated:

- five vapor points around the hotel footprint (1 east and 2 west along the long edge of the rectangular hotel footprint, and one on the shorter north and south sides of the hotel footprint;
- four around each side of the restaurant footprint
- one along the western edge of the ridge near where the RIC will occur for a large parking lot area close to the adjacent residential houses to the west; and
- one near former SA-3 where the aerosol cans were located and where RIC work will be conducted for a parking lot,
- for a total of eleven vapor points.

The parties will discuss which of these points will remain part of a long-term management program-post development.

With permission from NYSDEC – and as available – additional vapor monitoring may also be conducted at 1 or more of NYSDEC's off-site vapor points on the east side of Marbledale Road, particularly during the RIC activities and future pile work at the proposed restaurant area.

The eleven (11) proposed on-site soil vapor wells are shown on Figure 2, a site plan showing the proposed plan. The soil vapor wells will be installed using the Geoprobe® drilling method or the hollow stem auger method, as required. The vapor monitoring wells will be constructed of 1-inch Schedule 40 PVC 10 slot well screen and solid riser pipe. Each vapor well will be constructed using 15 feet of screen that will be set in the unsaturated zone above the water table to an approximate completion depth of 20 ftbg (feet below grade), depending on where the observed water table and bedrock are noted beneath the site. The annular space around each well screen will be backfilled with No. 2 filter sand to at least two feet above the well screen. A three-foot bentonite seal will then be placed atop the sand pack and the borehole will be grouted to grade using a tremie pipe to install a

bentonite Portland cement mixture. The team will evaluate if any temporary vapor monitoring points could be protected in a less expensive way (large concrete blocks). Vapor monitoring well will be set in a protective steel casing with a minimum 3-foot stick up. The soil vapor monitoring well construction details are included on Figure 3.

Prior to, during and after pile installation at each of the proposed building locations and RIC work, vapor samples will be collected from each of the vapor monitoring wells in accordance with NYSDOH Soil Vapor Sampling Guidelines for a total of three (3) vapor monitoring and sampling rounds. If a significant change based on field data occurs, a lab sample could be run to manage the changes if necessary. This will be based on a percent change in concentrations and the persistence of any changes. Prior to sampling, a minimum of three well volumes of air will be purged from the wells using a vacuum pump. Following purging, soil vapor samples will be collected using 6-liter Summa canisters from a sealed secure sample port at the well heads. The vapor samples will be sent to a New York State certified laboratory where they will be analyzed for the presence of VOCs using EPA Method TO-15 (including Freons). The collected data will be analyzed and tabulated following the sampling and will be used to monitor the impact, if any, of pile driving or RIC activities on soil vapors in and around the building foot prints and as a monitoring system to prevent further migration of soil vapors from beneath the site. Sample data will also be used for the SVE design. The field screening of vapors that was initiated during the Micropile Pilot test will be continued during the full-scale pilot and RIC work, so that 'real time' assessments of changes in vapor levels can be assessed.

HES will complete the vapor monitoring well installation and the first round of soil vapor sampling prior to the start of RIC and micropile work. As required, HES will notify the NYSDEC and the Village of Tuckahoe a minimum of 7 to 10 days in advance of conducting any field work. Daily and monthly updates will be provided to the NYSDEC and the Village in accordance with the RAWP. Data from the baseline round of vapor sampling will be forwarded to NYSDEC and HDR immediately upon receipt.

D. SWPPP Controls:

All soil erosion and sediment controls and site fencing / signage have been installed along the site perimeter in accordance with the approved site-wide Storm Water Pollution Prevention Plan (SWPPP).

II. Environmental Compliance Work and Contingency Plans

All pile operations will be done in accordance with the following environmental compliance and contingency plans, which are included in the RAWP and more updated previously approved NYSDEC-BCP Investigation and Remedial Design document dated September 23, 2016 (RDWP); the Source Area, Grading, and Micropile Pilot Test Scopes of Work ("Environmental Plans").

A. HASP; OSHA HAZWOPER, QAPP and CAMP Monitoring

The Site Specific Health and Safety Plan (HASP; HES), OSHA HAZWOPER training certifications / documentation, Quality Assurance Project Plan (QAPP) and Community Air Monitoring Plan (CAMP) contained in the RAWP and other documents stated above will all be implemented during this work. Therefore, in accordance with the

approved Environmental Plans, the CAMP will be implemented to monitor air quality during all on-site intrusive work including the Site grading, Micropile drilling work and RIC work. The "Work Areas", will be defined in this Plan based on the location on the Site where the Site grading, pile drilling and RIC activities will be occurring. The "Work Area" for purposes of placement of the CAMP equipment will still be roughly within 20-30 feet from any of the locations where these three activities (grading pile drilling or RIC work) are occurring, with the CAMP equipment being moved and monitored during these activities by the HES on-site geologist / environmental scientist as required to adequately cover the portion of the Site where activities will be taking place using: four CAMP monitoring stations each containing a photoionization detector (PID)s, and a real-time particulate/aerosol (Dust) monitor. Portable instrumentation will be used so it can be moved around the Site.

As per the RAWP and the subsequent environmental scopes prepared for the source area soils removal, the CAMP will consist of two CAMP stations placed downwind, and one upwind of the pile installation and RIC Work Areas and a fourth CAMP monitor will be placed outside of the Work Area(s) between the work area and the nearest building or a potential receptor outside the property line. A fifth CAMP monitoring station will be located between the site and the Waverly School. In addition, hand-held instrumentation including: (1) a calibrated four gas meter (%LEL, %O2, H2S and CO sensors); (2) photoionization detector (PID); and (3) a flame ionization detector (FID) will be used to monitor in the area of the pile drilling and RIC operations (downwind side if possible) while the work is ongoing. Action levels for the CAMP (dusts, VOCs) and work within 20-feet of a property line have been described elsewhere and will continue for the pile and RIC work. More details on the CAMP Monitoring are provided below.

Since the piles are to be drilled through the landfill material and potential debris, there is the possibility of releasing methane and/or H2S. The 4-gas meter readings will be evaluated throughout the Micropile drilling and sustained readings (5 minutes or more) of 20% LEL and 2 ppm H2S in the breathing zone at the drilling area will be the action level. In the event the action level is exceeded, a response contingency is required including use of water or foam. To the extent these contingency measures do not work, the drilling will be halted until the team evaluates the cause of the excessive methane levels. Measurements will be taken at the nearest downwind edge of the Work Area and if sustained readings are above 5% LEL and 1 ppm H2S at this location then the pile advancement should be halted until the concentrations drop or the source of the elevated readings is determined and mitigated.

B. Vapor Monitoring

As noted above, a vapor monitoring program was conducted during the micropile pilot test, including collection of baseline data. All data were shared with DEC and HDR. While a consistent pattern of field data during the micropile pilot monitoring is not discernable given the differences in compounds detectable by the PID versus the FID, generally, any increase in concentrations returned to at or near baseline at some point during the work.

A vapor monitoring program was developed for planned site work, including the RIC and micropile activities – in addition to other remaining work elements, if needed. The vapor monitoring program is described below. The major objective of the vapor monitoring program is ensuring that no additional migration of vapors from the site via the soil vapor pathway occurs during the RIC and micropile work.

Baseline PID and FID readings, and 4-gas monitor readings, will be collected from the 11 new vapor monitoring points, monitoring wells # 1, 3, 4, 5, 7, 9, and OW-2 and soil vapor extraction point SVE 1. These points will be monitored prior to the start of pile or compaction work each day, and then routinely during work days (minimum every 3 hours) thereafter or as needed based on site work activities, work locations, and field conditions. Instrument readings will also be obtained following the cessation of RIC and/or micropile work on each day when one or both of those activities occurs, to monitor for changes in vapor concentrations relative to baseline readings. FID readings will be made with and without the activated carbon filter tip to ascertain the contribution to the reading by Freons. Action levels for instrument readings at vapor monitoring points during the work are discussed below and are based on review of the micropile pilot test data.

Readings of two to three times the baseline will serve as an action level for VOCs if sustained for two or more monitoring periods and do not return to at or near baseline following cessation of RIC or pile work in a particular area of the site. Data outside these parameters will be evaluated for a response action based upon review by NYSDEC. Examples of responses may include but are not limited to further monitoring; temporarily stopping RIC / micropile work in an area of the site so that further vapor monitoring can be conducted; re-locating RIC and micropile work activities to other areas of the site (i.e., to further distance from nearest property line); additional monitoring points or active extraction and treatment of vapors; investigation into possible sources. Vapor monitoring field data will be shared with NYSDEC and HDR on a daily basis, and summary tables similar to Table 1 (pilot test) will be compiled.

If elevated or unusual levels (e.g., significantly above baseline readings, see above) are observed, they will be reported immediately with an action plan to address (e.g., halt work at area temporarily; vapor treatment; other). NYSDEC reserves the right to halt work for longer periods of time depending on the vapor monitoring findings, and the development of appropriate response actions that need to be considered or implemented.

All boring casings (from new piles that are not grouted, vapor wells, monitoring wells) will be capped /sealed at the end of each work day using the existing manufactured well caps or plastic sheeting and duct tape (or other solid cover). PID, FID, and 4-gas monitor readings will be collected at grade around the site work areas after the “active” monitoring points or piles are capped/sealed to document that there are no ambient (outdoor) instrument readings above site background. This periodic ambient monitoring is in addition to the subsurface soil vapor monitoring, and results should be tabulated In a separate summary table. Ambient air instrument readings shall be furnished to NYSDEC and HDR on a weekly basis; however, if elevated or unusual levels (e.g., significantly above historic baseline instrument readings during Source Area excavations) are observed, they will be reported immediately.

Contingency measures, including water and spray foam (RusFoam® OC [AC645] [see attached specifications sheet attached to the SA-2 Work Plan] or equivalent) will be available on-site should dust and/or VOC/odor control become necessary during this pile drilling work. The spray foam was tested on January 25, 2017 to ensure contractors are familiar with application techniques. All field work will be conducted in accordance with the requirements of the HASP.

The above-described vapor monitoring (field instruments; “real-time”) is in addition to the Contractors’ Health & Safety monitoring that may be conducted.

C. Soil Spoils Stockpiling

In the event that soil stockpiling is necessary in relation to any drilling spoils, all spoils will be temporarily staged in the stockpile staging areas constructed prior to the start of excavation activities in accordance with the RAWP and then removed from the site for proper disposal as was done for the soil boring investigation. Stockpiling on-site soil/fill with no evidence of contamination (i.e., no staining or elevated PID/FID measurements, or no noticeable odors) may take place in approved areas in approximately 50 cubic yard piles, until removed or required for backfill. If stockpiling is to take place, stockpiles will be placed, graded, shaped, and covered for proper drainage. Soil stockpiles shall be located away from the edge of excavations.

Stockpiling of on-site soil/fill with evidence of contamination (staining and/or elevated PID measurements) may take place in approved areas in approximately 50 cubic yard piles, until sample analysis is completed. Stockpiles will be placed, graded, shaped, and covered for proper drainage. This will ensure effective weather proofing of potentially contaminated soil stockpiles. Materials shall be located and retained away from edge of Work Areas or excavations.

Stockpiles will be kept covered at all times with appropriately anchored polyethylene sheeting or tarps. Foam suppressants will be utilized based on field screening and observations, and at the direction of NYSDEC and the Village.

Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced. Foam suppressants – if used – will be maintained and re-applied in accordance with manufacturer's specifications. The stockpiled soil/fill will be placed on top of and be completely covered using polyethylene sheeting with a minimum thickness of 6 milliliter (ml) to reduce the infiltration of precipitation and to eliminate the formation of dust. The stockpile area shall be protected from stormwater runoff. For a completed stockpile, edges of the sheeting shall overlap a minimum of two feet and duct tape shall be applied along all seams to prevent movement of sheeting and infiltration of precipitation into the stockpiled soil. Non-soil weights (e.g. tires, or rock/concrete pieces) may be necessary to inhibit movement of the cover sheeting by wind. Soil stockpiles will be continuously encircled with a berm and/or silt fence.

The berm wall shall be constructed around the stockpile using uncontaminated material covered with the same sheeting as the stockpiled material. Hay bales will be used as needed near catch basins other discharge points. As of the date of this Work Plan, all SWPPP measures have been installed along with truck tracking pads at both entrances to the site. Stockpiles will be inspected at a minimum once each week and after every storm event, and in accordance with the site SWPPP. Results of inspections will be recorded in a logbook and maintained at the site and available for inspection by NYSDEC.

D. Truck Pad & Wash Station

To the extent needed, the transport vehicle tracking pad for vehicle loading operations will be used to control and contain contaminated soil and debris spillage along with a truck cleaning station if materials are encountered that cannot be reused on site. The site entrance and tracking pad detail and truck washing station description and detail are included in the SA-2 Scope document Appendix B – "Alternative to Truck Washing Station".

E. Contingency Plans

The pile installation work will not require any open excavations. The recirculation sump pits, which are described above in detail in the Mud/Water Rotary Drilling section, are lined, and contain a concrete drain ring. During on-site drilling of groundwater wells and deep borings to date, there were no CAMP, FID, dust or odors issues. However, to the extent drilling causes any odor, dust or vapor issues above the applicable CAMP action levels or other action levels in this Plan and the RAWP and other Environmental Plans, the pile drilling location will be covered with either 6 ml polyethylene sheeting and/or foam as required to control dust and vapor that could emanate from the drilled pile location. If foam is required, it will be reapplied as needed to control odors and dust. All piles will otherwise be drilled in accordance with this plan if there are no safety, odor, or other nuisances issues. If odors or other nuisance issues are noted, or for any safety reasons, pile drilling shall stop and the drill boring closed with backfill material even if it has to be removed later to perform sampling or excavation at a later time or to determine the source of the issue.

Since pile drilling will occur to depths of more than 5 feet, the following contingency protection actions shall be utilized under the following conditions:

- Foam will be available as required to control dust and vapor that could emanate from drilled pile location.
- Drill Spoils: Any spoils generated will be appropriately characterized and disposed of off-site in accordance with all applicable local, State, and Federal rules and regulations.

The piles, after installation, will be cut to length, reinforced and grouted. After grouting the piles, the concrete pile caps will be formed, reinforced and poured in place. Subsequently the grades will be brought up 2'6" to bottom of grade beams and those will be formed, reinforced and poured. The final step will be to bring grades up to bottom of slab, underground utilities installed, the vapor extraction system and piping installed and final stone fill and vapor barrier installed prior to the slab being poured.

The backfill that will be placed on hotel footprint at various stages of foundation work will be the appropriate backfill material in accordance with the regulations and DER-10 guidance requirements or with imported backfill material that also meet these requirements and has received an approved BUD. This BUD material is discussed in detail in the Grading Plan.

<u>Community Air Monitoring Plan Continued During the Work:</u>

As with all work being performed on the Site, for the CAMP stations, if the ambient air concentration of total organic vapors (PID) at the downwind perimeter of the work area exceeds 5 parts per million (ppm) above background for a 15-minute average, work activities will be temporarily halted and monitoring continued. If the ambient air FID readings at the downwind perimeter of the work area exceeds 5 parts per million (ppm) above background for a 15-minute average, work activities will be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities will resume with continued monitoring. If total organic vapor levels at the downwind perimeter of the Work Area persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps bring the vapor levels below 5 ppm over background for the 15-

minute average, work activities will resume provided that the total organic vapor level 200 feet downwind of the work area or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less remain below 5 ppm over background for the 15-minute average. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be shut down and the area backfilled or otherwise covered with foam
suppressant and plastic sheeting.

Particulate concentrations will be monitored at each of the CAMP station locations. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work will continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m3 above the upwind level and provided that no visible dust is migrating from the work area. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m3 above the upwind level, work will be stopped and re-evaluation of activities will be initiated. Work will resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m3 of the upwind level and in preventing visible dust migration. CAMP data will continue to be reported to the NYSDEC and NYSDOH on a weekly basis with the exception of exceedances of action levels that will be reported at the time of exceedance.

Additionally, daily CAMP and summary sheets will continue to be sent to the Village's environmental consultant (weekly summaries to NYSDEC and NYSDOH). The CAMP will provide air monitoring data in real-time via Environet at the site so that there is no delay in responding to VOCs or particulates that approach or exceed the action levels. The CAMP systems will be setup to notify site personnel of exceedances (or "near-exceedance levels") so the contractor can respond promptly as necessary with corrective measures if the elevated readings are caused by the excavation activities.

Groundwater Monitoring:

Prior to full-scale Micropiling and RIC work, a new round of groundwater monitoring will be conducted. The 2016 well couplets (OW-1/BW-1; OW-2/BW-2; OW-3/BW-3) and existing well MW-8 will be sampled and analyzed for the full list of compounds (i.e., those analyzed for during the Fall 2016 work). Additional rounds of "during development" groundwater monitoring will be finalized based on NYSDEC discussions. Subsequent groundwater sampling rounds may include the wells listed above and additional wells from the network.

The second groundwater monitoring event identified in the RAWP and pre-characterization plan must be implemented at some point toward the end of remedial work. It is recommended that the timing of that event occur toward the middle or end of the pile drilling/RIC or if the vapor monitoring indicates a change, which could be indicative of a release of contaminants that could affect groundwater.

Prepare Soil Vapor Sampling and Monitoring Letter Report

Following completion of the above outlined soil vapor sampling; HES will compile post soil vapor sampling update reports and a final letter report for submittal to the NYSDEC. The reports will summarize the soil vapor sampling

activities and results and will include detailed information on the pile installation drilling activities with respect to soil vapors.

In accordance with the BCP requirements and the QAPP, all soil vapor data will be validated by an independent data validation firm.

Health and Safety Procedures for Intrusive Activities:

Per previously approved "Grading Scope of Work" Letter dated March 10th, 2017, and as described above.

Please feel free to contact me should there be any questions about the Grading Scope of Work. I can be reached at 716-240-9177.

Sincerely,
Peak Construction Group, LLC

Lee Crewson
Principal

Attachments:

1. Micro Pile Submittal: 316300-01.1
2. Sump Pit – Figure 1
3. SV Well Layout – Figure 2
4. SV Well Details – Figure 3
5. Pile & Pile Cap Work Flow Diagram
6. M9-1 Hydraulic Crawler Drill Brochure
7. HD180 Hydraulic Crawler Drill Brochure
8. Carlin, Simpson & Associates: Ground Improvement Plan - Rev 1- dated 11/30/2016
9. Table 1 - Well Vapor Readings - Pile Test

Cc: Mr. Bill Weinberg – Bilwin Development Affiliates, LLC
Linda Shaw, Esq – Knauf Shaw, LLP
Mr. Mike Musso, PE, HDR – Village Environmental Consultant

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Remedial Bureau C
625 Broadway, 11th Floor, Albany, NY 12233-7014
P: (518) 402-9662 I F: (518) 402-9679
www.dec.ny.gov

May 9, 2017

Lee Crewson Principal
Peak Construction Group
1169 Harlem Road, Suite 3-S
Buffalo, NY 14227

RE: Former Marble Quarry Landfill Site
RIC and Pile Scope for
Environmental Concerns
Contingent Approval
Site ID No. C360143

Dear Mr. Crewson,

The New York State Department of Environmental Conservation (Department) has reviewed the subject document dated May 8, 2017. The subject version was received by email at 4:17PM on May 8 and watermarked “Final - Approved”. The scope was revised based upon Department and HDR comments.

With the clarifications below, the scope is approved as far as the Department is concerned. It is my understanding that the Village must also approve the scope of work per the planning board resolution.

- The channel from the boring location to the collection pit for the mud rotary drilling will be lined with plastic as per our discussions. This was not specifically reflected in the text or Figure 1.
- The text and figure 3 in regard to the vapor point design are not in complete agreement. The text more accurately reflects the discussion in terms of screen length and should be followed.
- It is the Department’s understanding that the compaction will begin in the identified area in the northwest corner of the site following installation and sampling of vapor points.

Please contact me at (518) 402-9799 or kevin.carpenter@dec.ny.gov if you have any questions.

Sincerely,

Kevin Carpenter

Kevin Carpenter P.E. Project Manager
Remedial Bureau C
Division of Environmental Remediation

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

ec: G. Heitzman
A. Omorogbe
D. Burke, Administrator, Village of Tuckahoe
M. Musso, HDR
M. Schuck (NYSDOH)
R. Ockerby (NYSDOH)
B. Williams, Village of
Tuckahoe Building Inspector
D2

SUBMITTAL COVER

Project: Springhill Suites
109 Marbledale Road
Tuckahoe, NY 10707

CM: Peak Construction
1169 Harlem Road
Buffalo, NY 14227
716-240-9177

Architect WMW Architects p.c.
100 Clearbrook Road
Elmsford, NY 10523

Date: 2/23/2017
Submittal No: 316300-01.1

Spec section	316300 - Bored Piles		
Contractor	Environmental Bulkheading		

Description REVISED

Items	Manufacture/Supplier		Description
1	Morris-Flood Associates		Foundation Pile Shop Drawings

WMW Architects p.c.	DATE

GENERAL NOTES:

A. PROJECT DESCRIPTION:

1. SCOPE OF WORK COVERED BY THIS DRAWING SET CONSISTS OF INSTALLING MICROPILES. THE MICROPILES CONSIST OF A GROUT FILLED CASED SECTION WITH AN UNCASED BONDED LENGTH EXTENDING BELOW THE CASING. THE MICROPILE HAS A STEEL CORE CONSISTING OF FULL LENGTH THREADBAR. THE BOND LENGTH IS DEVELOPED IN ROCK.

2. PROJECT:
   MARRIOTT SPRINGHILL SUITES
   109-125 MARBLEDALE ROAD
   TUCKAHOE, NY

B. DRAWING LIST

FO-901	FOUNDATION PILES KEY PLAN AND GENERAL NOTES
FO-902	FOUNDATION PILES PILE LAYOUT AND NUMBERING PLAN
FO-903	FOUNDATION PILES SECTIONS AND DETAILS
FO-904	FOUNDATION PILES PILE LOAD TEST LAYOUT PLAN
FO-905	LOAD TEST ARRANGEMENTS, PLANS AND SECTIONS

C. CODES AND REFERENCES:

1. 2016 NEW YORK STATE BUILDING CODE – IBC 2015

2. FHWA PUBLICATION FHWA-SA-97-070 "MICROPILE DESIGN AND CONSTRUCTION GUIDELINES IMPLEMENTATION MANUAL".

3. AISC STEEL CONSTRUCTION MANUAL, 14TH EDITION.

D. REFERENCE DOCUMENTS:

1. PROJECT STRUCTURAL DRAWING SET PREPARED BY GMCE, PC; ISSUED FOR PERMIT, DATED 02/03/17.

2. "REPORT OF SUBSURFACE SOIL AND FOUNDATION INVESTIGATION", PREPARED BY CARLIN SIMPSON & ASSOCIATES, DATED 12/11/2015.

E. DESIGN BASIS AND PILE CAPACITY:

1. SOIL AND ROCK DATA AND GEOTECHNICAL PARAMETERS FOR PILE DESIGN WERE DEVELOPED BY MORRIS-FLOOD ASSOCIATES BASED ON THE BORING LOGS INCLUDED IN THE GEOTECHNICAL DOCUMENTS REFERENCED IN SECTION D ABOVE.

2. PILE CAPACITY IS DEVELOPED BY GROUT TO GROUND BOND IN BEDROCK. END BEARING IN THE ROCK SOCKET AND LOAD TRANSFER TO ROCK THROUGH THE CASING IS NOT CONSIDERED IN THE DESIGN.

3. SEISMIC DESIGN DATA:
   SEISMIC DESIGN CATEGORY B (REF: STRUCTURAL DRAWING S-400).

F. MATERIALS:

1. MICROPILES:

CASING:	NEW MILL SECONDARY STEEL PIPE; FLUSH JOINT MACHINED THREADED ENDS (BOX THREADS); MATERIAL SIMILAR TO API N-80 AND MEETING THE REQUIREMENTS OF ASTM A252 GR. 3; Fy(min) = 50ksi; MATERIAL TEST REPORTS SHALL BE PROVIDED. STARTER SECTION SHALL BE PROVIDED WITH CARBIDE J-TEETH OR RING BIT AT CONTRACTOR'S OPTION; SUPPLIER TO FURNISH MATERIAL TEST REPORTS.
CORE STEEL:	THREADBAR CONFORMING TO ASTM A615 GRADE 75 (Fy = 75ksi); UNCOATED; MATERIAL TEST REPORTS SHALL BE PROVIDED.
CORE STEEL COUPLERS AND HEX NUTS:	PROVIDED BY THREADBAR MANUFACTURER; GRADE AND THREAD TO MATCH THREADBAR; HARDWARE SHALL BE CAPABLE OF DEVELOPING 100% OF THE THREADBAR GUTS.
CENTRALIZERS:	PVC; 10' C/C SPACING AND 1.5' FROM ENDS
GROUT:	5000 PSI NEAT CEMENT (SEE GROUTING REQUIREMENTS ON DRAWING FO-903)
CEMENT:	ASTM C150, TYPE I OR II PORTLAND CEMENT
PLATE ("R"):	ASTM A572 Gr. 50

2. LOAD TEST FRAMES:

W SHAPES:	ASTM A992
HP SHAPES:	ASTM A572 GR. 50
C SHAPES AND MISC.:	ASTM A36 OR BETTER
PLATES:	ASTM A36 OR BETTER

G. DRILLING AND INSTALLATION:

1. REFER TO DRAWING FO-903 FOR DRILLING REQUIREMENTS. THE NOTES BELOW ARE IN ADDITION TO THE SPECIFIC REQUIREMENTS OF FO-903.

2. THE MICROPILES WILL BE DRILLED WITH DUPLEX ROTARY AND ROTARY PERCUSSION EQUIPMENT. DUPLEX DRILLING METHODS WILL BE USED TO ADVANCE CASING TO AND INTO ROCK (CONTINUOUS CASING TO ROCK WITH AN INTERNAL WATER OR AIR FLUSH).

3. ADVANCE THE OUTER DRILL CASING AND INNER DRILL ROD SIMULTANEOUSLY TO THE SPECIFIED DEPTH/TIP ELEVATION (1' MINIMUM EMBEDMENT INTO ROCK) MAINTAINING INTERNAL FLUSH CONDITIONS.

4. AFTER SEATING CASING IN ROCK, DISENGAGE THE OUTER DRILL CASING FROM THE ROTARY HEAD.

5. ADVANCE THE INNER DRILL STRING THROUGH THE SPECIFIED ROCK SOCKET LENGTH USING ROTARY PERCUSSIVE EQUIPMENT WITH AN AIR FLUSH.

6. DRILLING AND INSTALLATION USING AIR AND A DOWN-THE-HOLE HAMMER:
   a. DURING DRILLING, MAINTAIN AIR PRESSURE TO THE DRILL BIT AT THE MINIMUM REQUIRED TO LIFT THE CUTTINGS THROUGH THE CASING AND TO FIRE THE HAMMER. AIR PRESSURE SHALL BE CONTINUOUSLY MONITORED BY THE DRILLER DURING DRILLING. A POSITIVE AIR RETURN WITHIN THE CASING SHALL BE CONTINUOUSLY VERIFIED TO ENSURE THAT EXCESSIVE AIR IS NOT INJECTED INTO THE GROUND OUTSIDE OF THE CASING.
   b. DRILLING SHALL BE IMMEDIATELY STOPPED IF ANY OF THE FOLLOWING CONDITIONS ARE ENCOUNTERED:
      i. GROUND HEAVING.
      ii. AIR IS DETECTED RISING FROM THE EXTERIOR OF THE CASING.
      iii. IF CASING BECOMES CLOGGED WITH CUTTINGS.

7. FLUSH ROCK SOCKET CLEAN WITH AIR THROUGH THE INNER DRILL STRING.

8. WITHDRAW INNER DRILL STRING.

9. INSTALL CENTER BAR CORE STEEL.

10. TREMIE GROUT HOLE.

11. PILES LOCATED 4' OR LESS FROM ADJACENT GROUTED PILES SHALL NOT BE DRILLED UNTIL THE GROUT IN THE ADJACENT PILE HAS CURED FOR A MINIMUM OF 3 DAYS.

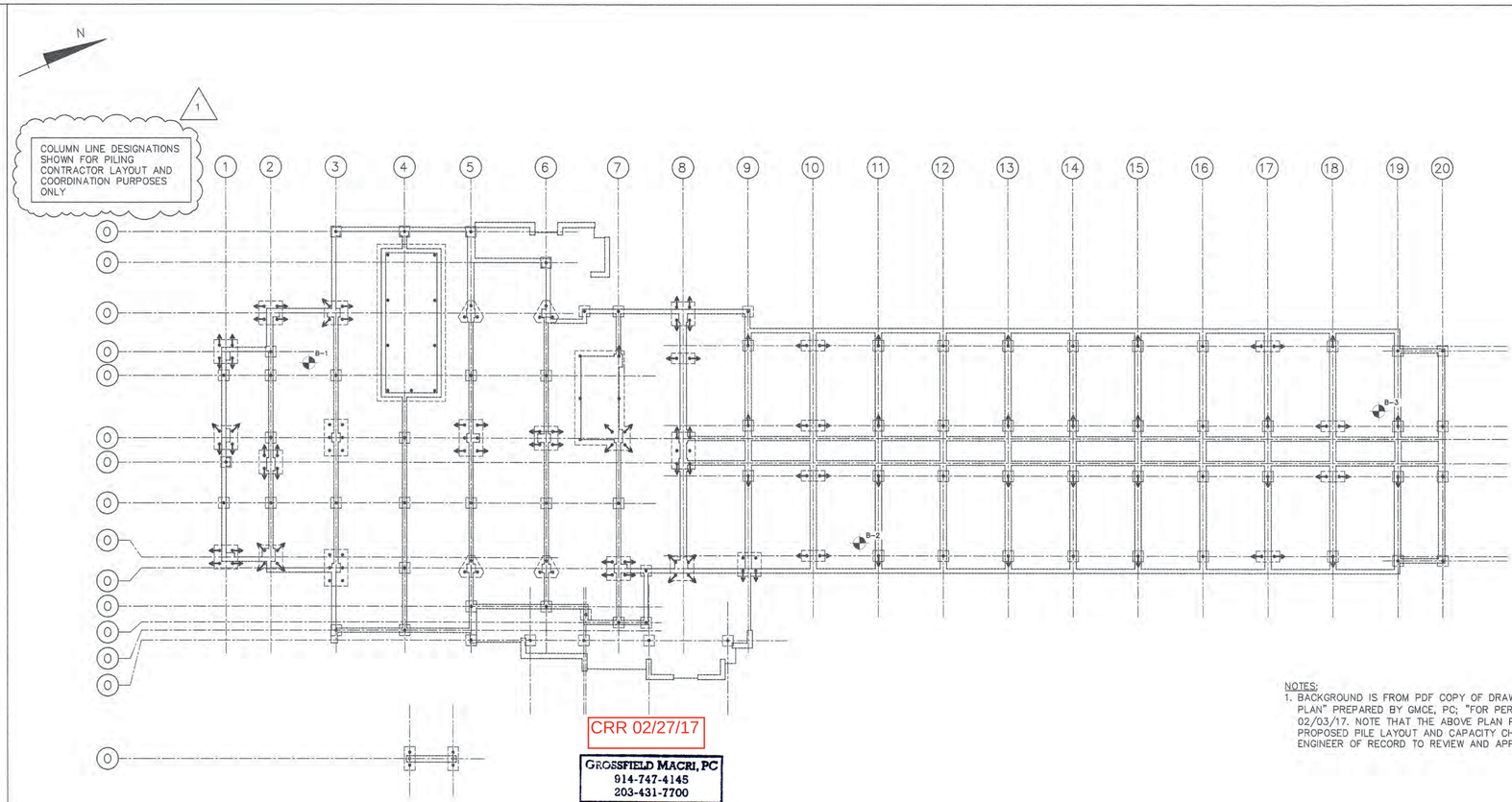
H. PILE TESTING AND ACCEPTANCE:

1. PILES WILL BE LOAD TESTED USING THE METHODS AND AT THE FREQUENCY SHOWN IN THE "STATIC AXIAL COMPRESSIVE LOAD TEST SCHEDULE" ON DRAWING FO-905.

2. LOAD TEST REACTION PILES AND LOAD TEST PILE WILL BE INSTALLED PRIOR TO INSTALLING THE BALANCE OF PRODUCTION PILES COVERED BY THE LOAD TEST.

3. TEST PILES AND THE PILE INSTALLATION SYSTEM WILL BE CONSIDERED ACCEPTABLE IF ALL OF THE FOLLOWING CONDITIONS ARE MET:
   a. TEST PILES MEET THE ACCEPTANCE CRITERIA OF IBC 2015 PAR. 1810.3.3.

4. AT THE COMPLETION OF THE LOAD TEST PROGRAM, INSTALLATION CRITERIA AS SPECIFIED IN THIS DRAWING SET WILL BE MODIFIED AS REQUIRED AND PRODUCTION INSTALLATION OF FOUNDATION PILES WILL PROCEED.



NOTES:
1. BACKGROUND IS FROM PDF COPY OF DRAWING S-100, "FOUNDATION PLAN" PREPARED BY GMCE, PC; "FOR PERMIT ISSUE", DATED 02/03/17. NOTE THAT THE ABOVE PLAN REFLECTS CONTRACTOR PROPOSED PILE LAYOUT AND CAPACITY CHANGES. STRUCTURAL ENGINEER OF RECORD TO REVIEW AND APPROVE.

CRR 02/27/17

GROSSFIELD MACRI, PC
914-747-4145
203-431-7700

Submission is in general conformance with design concept.	
Submission is in general conformance with design concept except as noted.	
Revise and resubmit.	
Submission is rejected for non conformance with design concept.	
No exception taken.	√
Hold for 28 day test.	

KEY PLAN
$\frac{1}{16}$"=1'-0"

GROSSFIELD MACRI, PC

Engineers review is for general compliance with the structural drawings and specifications. The contractor remains responsible for compliance with the Contract Documents (including specifications) for details and accuracy, for conforming and correlating all quantities and dimensions for electing fabrication processes, for means and methods of construction, for performing his work in a safe manner and for coordinating his work with that of other trades.

LEGEND:

B-X	APPROXIMATE BORING LOCATION (CARLIN SIMPSON 2015)
⊗	DRILLED MICROPILE; SEE FO-902 FOR COMPRESSION CAPACITIES.

5. PILES SHALL NOT BE LOAD TESTED EARLIER THAN ONE WEEK AFTER INSTALLATION. GROUT IN REACTION PILES AND TEST PILES SHALL BE ALLOWED TO CURE FOR A MINIMUM OF ONE WEEK PRIOR TO TESTING.

J. PILE INSTALLATION: GENERAL CONDITIONS:

1. THE SITE SHALL BE CLEARED OF ALL BURIED OBSTRUCTIONS PRIOR TO THE START OF PILE INSTALLATION.

2. AFTER REMOVING ALL BURIED OBSTRUCTIONS, THE SITE SHALL BE FILLED OR CUT TO THE SPECIFIED PILE INSTALLATION SITE GRADE ELEVATION. THE SITE SHALL BE PREPARED SO AS TO PROVIDE A FIRM AND LEVEL WORK SURFACE FOR THE PILE CONTRACTOR'S EQUIPMENT.

K. QUALITY ASSURANCE, INSPECTION, AND MONITORING:

1. SPECIAL INSPECTIONS SHALL BE PERFORMED IN ACCORDANCE WITH THE REQUIREMENTS OF THE 2015 IBC.

2. PRE-CONSTRUCTION CONDITION SURVEYS AND BASELINE OPTICAL SURVEY MEASUREMENTS SHALL BE MADE OF ALL SURROUNDING BUILDINGS POTENTIALLY AFFECTED BY THE PROPOSED CONSTRUCTION WORKS.

3. SPECIAL INSPECTION: PILES (BC 1705.8):
   a. CONTINUOUS SPECIAL INSPECTION IS REQUIRED DURING COMPLETE INSTALLATION OF ALL PILES (DRILLING, INSTALLATION OF CORE STEEL AND GROUTING.
   b. AT A MINIMUM, THE FOLLOWING SHALL BE INSPECTED FOR DRILLED CAISSON PILES:
      i. VERIFY PILE MATERIALS TYPE, SIZE, LENGTH, AND SPECIFICATION.
      ii. CONTINUOUSLY OBSERVE DRILLING METHODS AND DRILLING PROGRESS DURING INSTALLATION OF CASING.
      iii. VERIFY LENGTH OF ROCK SOCKET BELOW BOTTOM OF CASING.
      iv. VERIFY PROPER INSTALLATION OF CORE STEEL.
      v. VERIFY GROUT MIX, GROUT TAKE VOLUMES, AND GROUTING PROCEDURES.
      vi. VERIFY APPLICATION OF PILE TOP DETAILS (BEARING PLATES, UPLIFT ANCHORAGE, ETC.).
      vii. REVIEW THE RESULTS OF GROUT COMPRESSIVE STRENGTH TESTING (SEE ALSO PAR. K.4).
   c. REPORT ALL DEVIATIONS FROM THE APPROVED DRAWINGS TO THE ENGINEER OF RECORD AND VERIFY THAT ALL CORRECTIVE WORK AS SPECIFIED BY THE ENGINEER HAS BEEN IMPLEMENTED.

4. COMPRESSIVE STRENGTH TESTING OF GROUT (BY OTHERS):
   a. COMPRESSIVE STRENGTH TESTING OF GROUT SHALL BE PERFORMED BY AN APPROVED CERTIFIED TESTING LABORATORY. THE TESTING LABORATORY SHALL CONTROL ALL ASPECTS OF THE GROUT TESTING PROCESS INCLUDING SPECIMEN FABRICATION, CURING, TRANSPORTATION, HANDLING, TESTING, AND REPORTING.
   b. AT A MINIMUM, GROUT CUBE SAMPLES FOR COMPRESSIVE STRENGTH TESTING SHALL BE TAKEN EACH DAY THAT GROUT IS EMPLOYED IN THE CONSTRUCTION OF THE MICROPILES.
   c. AT A MINIMUM, GROUT FOR FIRST WEEK OF PRODUCTION PILES SHALL BE TESTED AT 3, 7, 14, AND 28 DAYS AFTER FABRICATION.
   d. AT A MINIMUM, GROUT FOR PRODUCTION PILES THEREAFTER SHALL BE TESTED AT 7, 14, AND 28 DAYS AFTER FABRICATION.
   e. COMPRESSIVE STRENGTH TESTING REPORTS SHALL BE PROVIDED WITHIN 1 DAY AFTER TESTING. REPORTS SHALL BE PROVIDED TO THE SPECIAL INSPECTOR AND TO MFA.

L. BURIED UTILITIES AND STRUCTURES:

1. THE GENERAL CONTRACTOR IS FULLY RESPONSIBLE FOR LOCATING AND CLEARING ALL UNDERGROUND UTILITIES AND BURIED STRUCTURES PRIOR TO THE START OF WORK.

M. LIMITATIONS OF USE AND DESIGN:

1. THE PROPOSED PILES DEPICTED ON THESE DRAWINGS HAVE BEEN DESIGNED EXCLUSIVELY FOR THIS PROJECT FOR ENVIRONMENTAL BULKHEADING CORPORATION AND ARE INTENDED TO BE CONSTRUCTED BY ENVIRONMENTAL BULKHEADING CORPORATION. THE DRAWINGS AND DESIGNS ARE NOT APPLICABLE ON EXTENSIONS OF THIS PROJECT, ON ANY OTHER PROJECT; AND ARE NOT FOR USE BY ANY OTHER PERSONS OR FIRMS.

NO.	REVISIONS	DATE
1	REVISED PER PROJECT TEAM COMMENTS	02-23-17
0	ORIGINAL ISSUE	02-10-17

ENGINEER:
MORRIS-FLOOD ASSOCIATES, LLC
GEOTECHNICAL-CIVIL-STRUCTURAL ENGINEERING
78 ROUTE 173 WEST, SUITE 5, HAMPTON, NJ 08827 ■ TEL: 908-730-8450

CLIENT/PILE CONTRACTOR: ENVIRONMENTAL BULKHEADING
P.O. BOX 460
BRIGHTWATERS, NY 11718

PROJECT:
MARRIOTT SPRINGHILL SUITES
109-125 MARBLEDALE ROAD
TUCKAHOE, NY

DRAWING TITLE:
FOUNDATION PILES
KEY PLAN AND GENERAL NOTES

STEPHEN J. FLOOD, P.E.
02/23/17
STATE OF NEW YORK · STEPHEN J. FLOOD · 081665 · LICENSED PROFESSIONAL ENGINEER
NEW YORK
PROFESSIONAL ENGINEER
LICENSE NUMBER 081665

WARNING
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DATE:	02-10-17
PROJECT No.	2017-02
DRAWING BY:	STF
CHECK BY:	JM
SCALE:	AS NOTED
DRAWING No.:	FO-901
CAD FILENAME: 201702fo901.dwg	1 of 5

N

PILE QUANTITIES	
40 TON MICROPILES, PRODUCTION	142
80 TON MICROPILES, PRODUCTION	58

LEGEND:

FOUNDATION MICROPILE

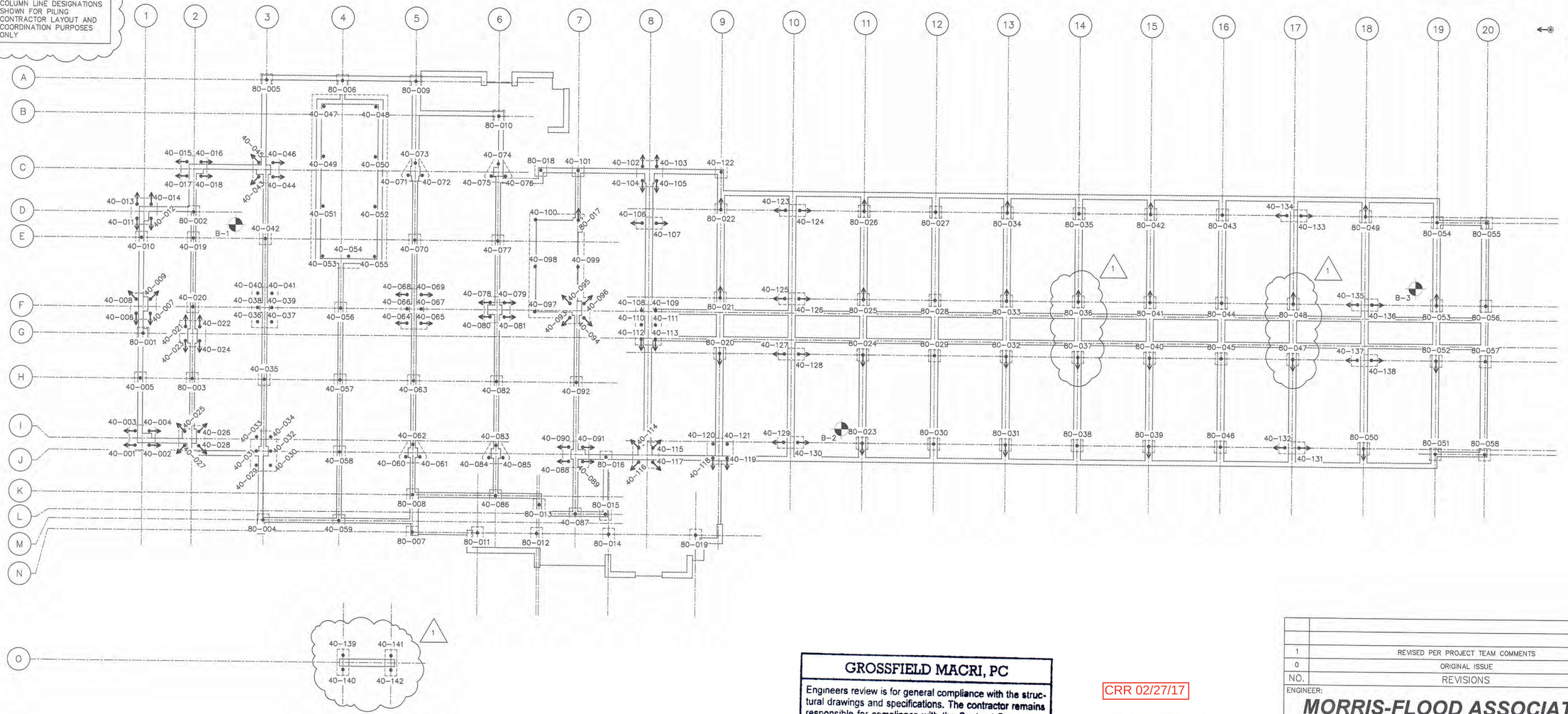
XX–XXX

MICROPILE ALLOWABLE COMPRESSION CAPACITY (TONS)

PILE NUMBER

COLUMN LINE DESIGNATIONS SHOWN FOR PILING CONTRACTOR LAYOUT AND COORDINATION PURPOSES ONLY

BATTERED PILE (SEE CONTRACT DRAWINGS FOR DETAILS)



PILE NUMBERING PLAN

3/32"=1'-0"

NOTES:
1. BACKGROUND IS FROM PDF COPY OF DRAWING S-100, "FOUNDATION PLAN" PREPARED BY GMCE, PC; "FOR PERMIT ISSUE", DATED 02/03/17. NOTE THAT THE ABOVE PLAN REFLECTS CONTRACTOR PROPOSED PILE LAYOUT AND CAPACITY CHANGES. STRUCTURAL ENGINEER OF RECORD TO REVIEW AND APPROVE.
2. SEE CONTRACT DRAWINGS FOR DIMENSIONED PILE LOCATIONS, CUT-OFF ELEVATIONS AND PILE CAP DIMENSIONS AND DETAILS.

GROSSFIELD MACRI, PC

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CRR 02/27/17

GROSSFIELD MACRI, PC 914-747-4145 203-431-7700	
Submission is in general conformance with design concept.	
Submission is in general conformance with design concept except as noted.	
Revise and resubmit.	
Submission is rejected for non conformance with design concept.	
No exception taken.	✓
Hold for 28 day test.	

NO.	REVISIONS	DATE
1	REVISED PER PROJECT TEAM COMMENTS	02–23–17
0	ORIGINAL ISSUE	02–10–17

ENGINEER:

MORRIS-FLOOD ASSOCIATES, LLC

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P.O. BOX 460
BRIGHTWATERS, NY 11718

PROJECT: MARRIOTT SPRINGHILL SUITES
109–125 MARBLEDALE ROAD
TUCKAHOE, NY

DRAWING TITLE: FOUNDATION PILES
PILE LAYOUT AND NUMBERING PLAN

STEPHEN J. FLOOD, P.E.
STATE OF NEW YORK · STEPHEN J. FLOOD · 081665 · LICENSED PROFESSIONAL ENGINEER
NEW YORK PROFESSIONAL ENGINEER LICENSE NUMBER 081665

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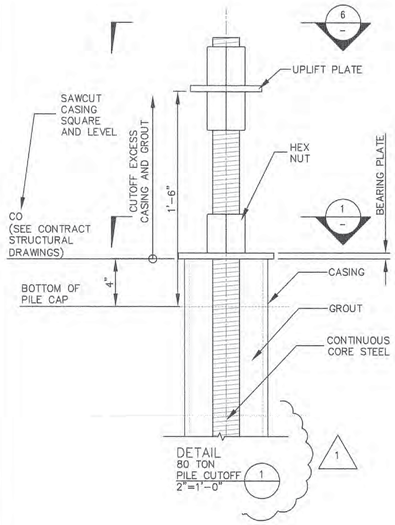
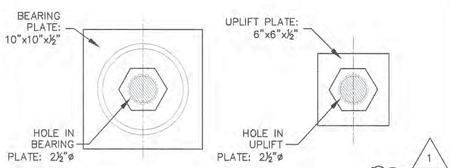
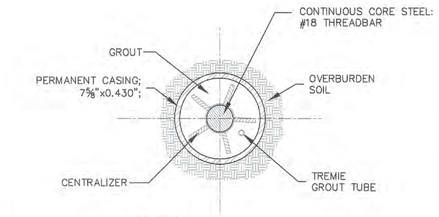
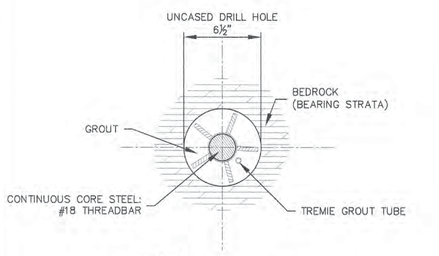
DATE:	02–10–17
PROJECT No.	2017–02
DRAWING BY:	STF
CHECK BY:	JM
SCALE:	AS NOTED
DRAWING No.:	F0–902
CAD FILENAME: 201702fo902.dwg	2 of 5

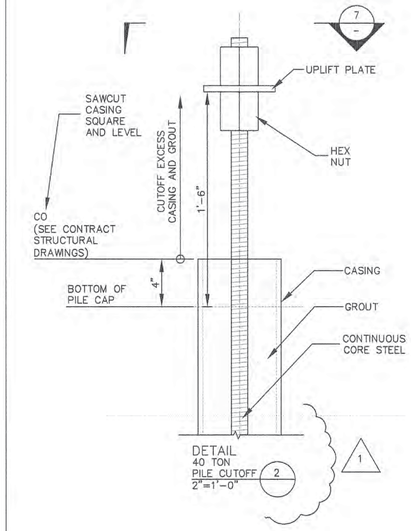


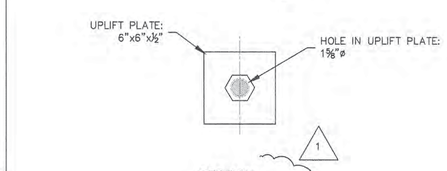


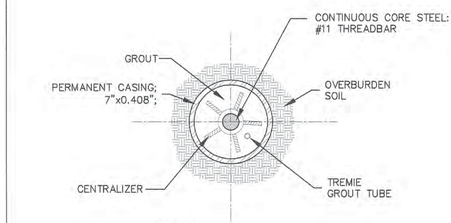


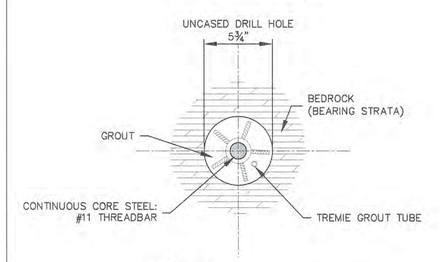


ALLOWABLE PILE CAPACITY:		
COMPRESSION:	80 TONS	
UPLIFT:	24 TONS	
LATERAL:	NONE SPECIFIED	
GROUT VOLUME:	GROUT VOLUME PER FOOT LENGTH OF PILE	
	VOLUME OF MIXED GROUT	BAGS OF CEMENT
CASED SECTION (SECTION 2):	0.222 CU.FT. (1.66 GAL)	0.19
ROCK SOCKET SECTION (SECTION 3):	0.203 CU.FT. (1.52 GAL)	0.18



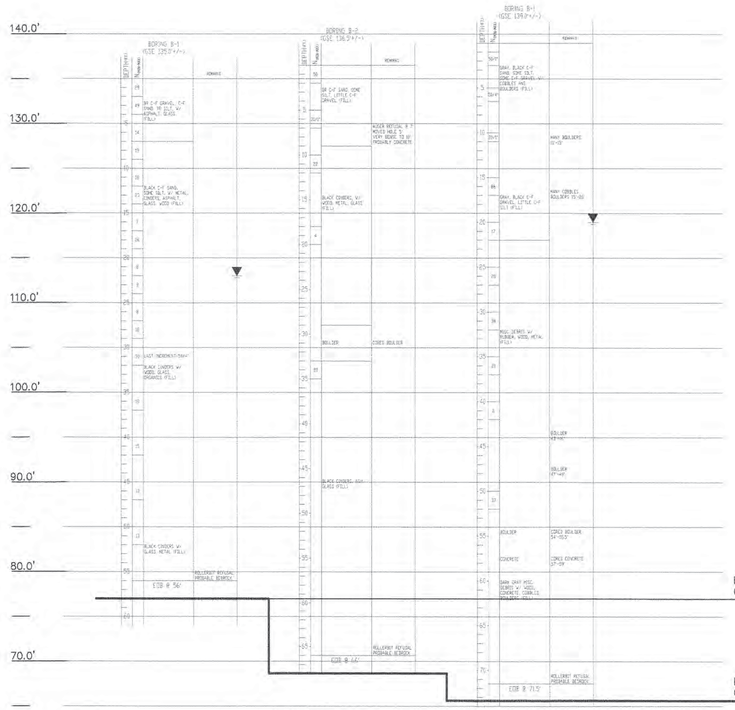


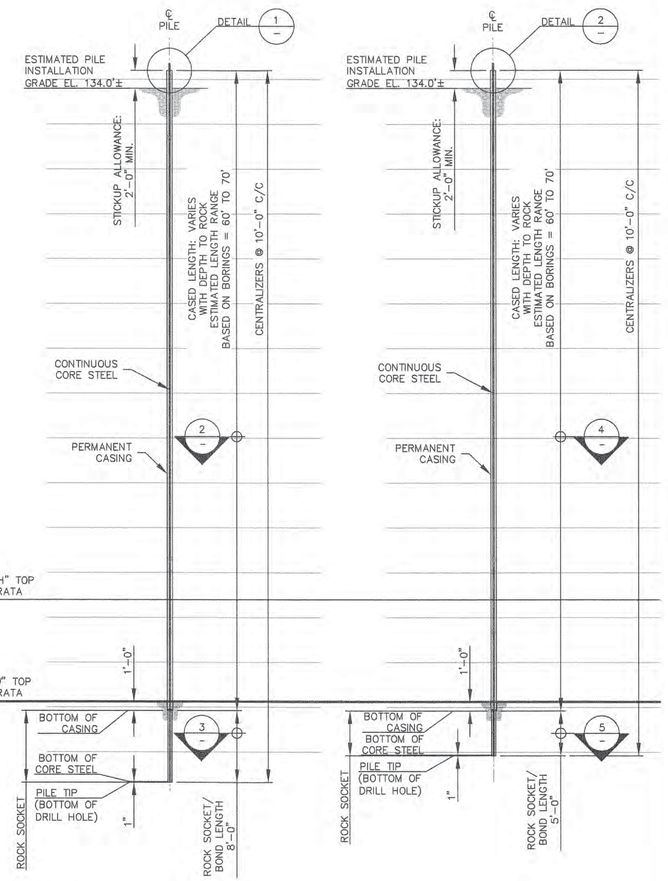




ALLOWABLE PILE CAPACITY:		
COMPRESSION:	40 TONS	
UPLIFT:	12 TONS	
LATERAL:	NONE SPECIFIED	
GROUT VOLUME:	GROUT VOLUME PER FOOT LENGTH OF PILE	
	VOLUME OF MIXED GROUT	BAGS OF CEMENT
CASED SECTION (SECTION 4):	0.198 CU.FT. (1.48 GAL)	0.17
ROCK SOCKET SECTION (SECTION 5):	0.169 CU.FT. (1.26 GAL)	0.15

GEOTECHNICAL BORING LOGS
(REPRODUCED BY MFA FROM BORING LOGS IN REPORT; NOTE 1)





GENERAL PILE DATA	
PILE TYPE AND CODE SECTION	MICROPILE SECTIONS 1810.3.10 AND 1810.4.10
DRILLING REQUIREMENTS:	SOIL/OVERBURDEN DRILLING: ROTARY-PERCUSSION DUPLEX (OUTER CASING WITH INTERNAL DRILL STRING) WITH AIR OR WATER FLUSH. ROCK SOCKET DRILLING: ROTARY PERCUSSION WITH AIR FLUSH (DOWN-THE-HOLE HAMMER).
ROCK SOCKET NOTES:	1. CASING SHALL BE SUFFICIENTLY SEATED IN ROCK TO PREVENT THE INFLOW OF SOIL INTO THE ROCK SOCKET.
GROUTING REQUIREMENTS:	
GROUTING METHOD AND PROCEDURES:	
INITIAL GROUT:	TREMIE GROUT THE FULL LENGTH OF PILE AFTER ROCK SOCKET LENGTH IS VERIFIED AND CORE STEEL IS INSTALLED; CLEAN GROUT OF THE SAME CONSISTENCY AS BATCHED SHALL BE OBSERVED TO BE FLOWING FROM THE TOP OF THE PILE
PRESSURE GROUT:	NOT REQUIRED
TOP-OFF GROUT:	MONITOR GROUT LEVEL IN PILE AND TOP OFF TO A LEVEL AT OR ABOVE THE SPECIFIED CUTOFF ELEVATION WHILE THE GROUT IS STILL FLUID.
POST GROUT:	NOT REQUIRED
GROUT MIX:	GROUT MIX (YIELDS APPROX. 1.14 CU.FT. (8.53 GALS)); w/c = 0.45; REQUIRED COMPRESSIVE STRENGTH=5000psi @ 28 DAYS (1) BAG (94 LBS) TYPE I OR II PORTLAND CEMENT (5) GALLONS POTABLE WATER 0.5 LBS FX-32 CATALYTIC AGENT (FOX INDUSTRIES); OPTIONAL GROUT SHALL BE MIXED IN A COLLOIDAL MIXER
	Sg = 1.89 (SPECIFIC GRAVITY OF GROUT MIX FOR FIELD VERIFICATION WITH A MUD BALANCE)
GROUT NOTES:	1. GROUT IS SITE PROPORTIONED AND BATCHED. 2. GROUT SHALL BE MIXED IN A COLLOIDAL MIXER; MINIMUM MIX TIME IS 2 MINUTES; MIXED GROUT SHALL THEN BE TRANSFERRED TO A HOLDING TANK WITH CONTINUOUS AGITATION. 3. GROUT SHALL NOT BE USED AFTER 90 MINUTES FROM BATCH TIME. 4. GROUT STRENGTH SHALL BE VERIFIED BY CUBE TESTING; SEE FO-901 "GENERAL NOTES" PAR. K.4. 5. GROUT VOLUME IS THE "NEAT" VOLUME TO FILL THE ENTIRE PILE TO THE TOP OF CASING WITH NO EXCESS; FIELD GROUT VOLUME SHALL BE A MINIMUM OF 10% GREATER THAN THE "NEAT" VOLUME.

GROSSFIELD MACRI, PC

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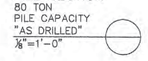

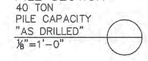

NOTES:
1. BORINGS REPRODUCED FROM SOIL AND FOUNDATION INVESTIGATION REPORT PREPARED BY CARLIN SIMPSON; DATED 12/11/15.
2. ALL ELEVATIONS REFER TO NAVD 88.

CRR 02/27/17

GROSSFIELD MACRI, PC
914-747-4145
203-431-7700

Submission is in general conformance with design concept.	
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Revise and resubmit.	
Submission is rejected for non conformance with design concept.	
No exception taken.	✓
Hold for 28 day test.	

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0	ORIGINAL ISSUE	02-10-17

ENGINEER:
MORRIS-FLOOD ASSOCIATES, LLC
GEOTECHNICAL-CIVIL-STRUCTURAL ENGINEERING
78 ROUTE 173 WEST, SUITE 5, HAMPTON, NJ 08827 ■ TEL: 908-730-8450

CLIENT/PILE CONTRACTOR: ENVIRONMENTAL BULKHEADING
P.O. BOX 460
BRIGHTWATERS, NY 11718

PROJECT: MARRIOTT SPRINGHILL SUITES
109-125 MARBLEDALE ROAD
TUCKAHOE, NY

DRAWING TITLE: FOUNDATION PILES
SECTIONS AND DETAILS

STEPHEN J. FLOOD, P.E.
NEW YORK PROFESSIONAL ENGINEER LICENSE NUMBER 081665

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DATE:	02-10-17
PROJECT No.	2017-02
DRAWING BY:	STF
CHECK BY:	JM
SCALE:	AS NOTED
DRAWING No.:	FO-903
CAD FILENAME: 201702fo903.dwg	3 of 5

N

LEGEND:

MICROPILE; SEE DRAWING FO-903

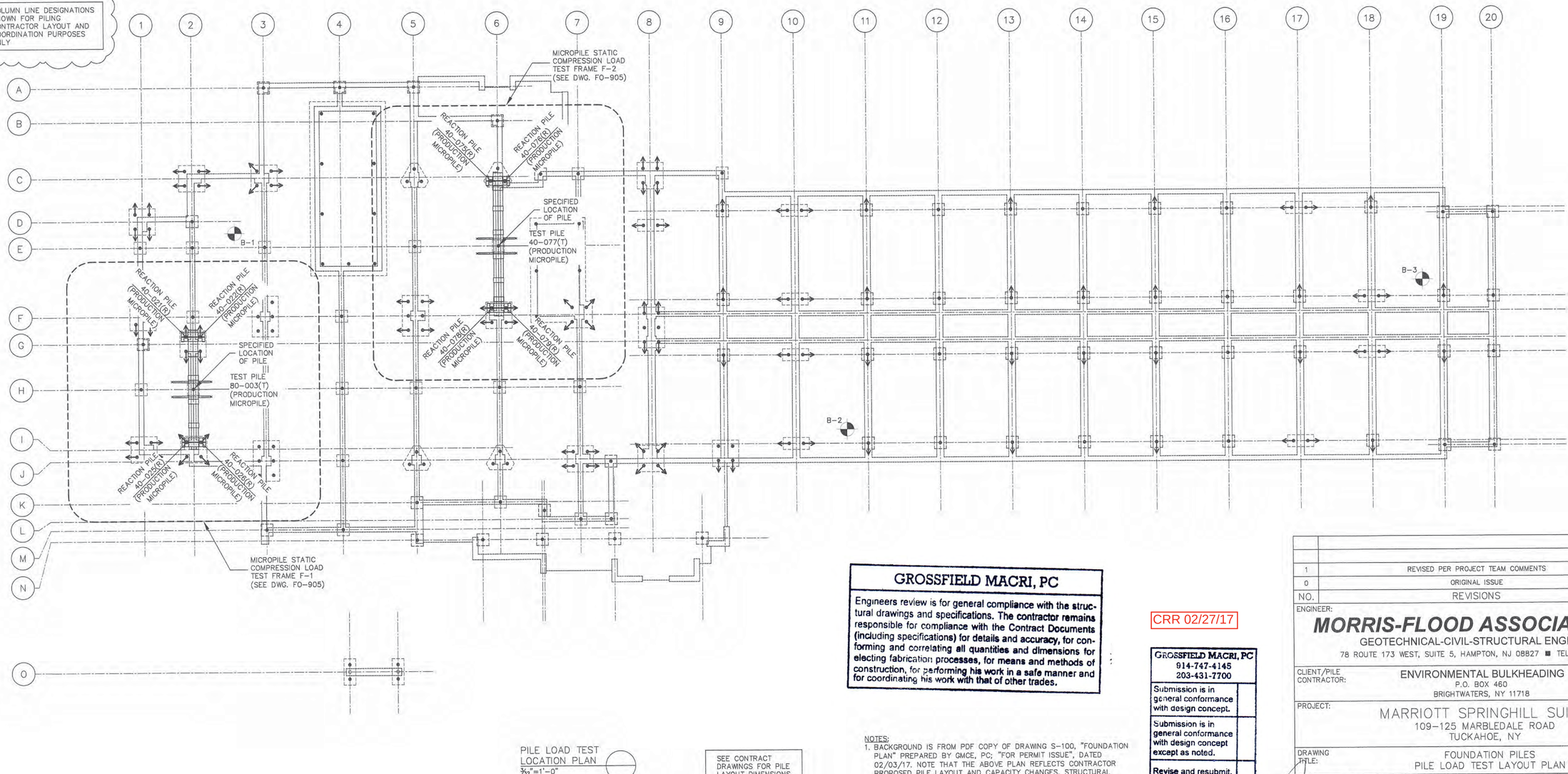
XX-XXX(R)(T)

- STATIC COMPRESSION LOAD TEST PILE
- LOAD TEST REACTION PILE
- PILE NUMBER
- MICROPILE ALLOWABLE COMPRESSION CAPACITY (TONS)

MICROPILE ALLOWABLE COMPRESSION CAPACITY (TONS)

1

COLUMN LINE DESIGNATIONS SHOWN FOR PILING CONTRACTOR LAYOUT AND COORDINATION PURPOSES ONLY



PILE LOAD TEST LOCATION PLAN

3/32"=1'-0"

SEE CONTRACT DRAWINGS FOR PILE LAYOUT DIMENSIONS

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GROSSFIELD MACRI, PC 914-747-4145 203-431-7700	
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No exception taken.	✓
Hold for 28 day test.	

NOTES:
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2. SEE CONTRACT DRAWINGS FOR DIMENSIONED PILE LOCATIONS, CUT-OFF ELEVATIONS AND PILE CAP DIMENSIONS AND DETAILS.
3. PILE NUMBER 80-003 IS TO BE INSTALLED AS AN 80 TON PILE FOR LOAD TEST PURPOSES. REQUIRED DESIGN CAPACITY IS 40 TONS.

NO.	REVISIONS	DATE
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PROJECT: MARRIOTT SPRINGHILL SUITES
109-125 MARBLEDALE ROAD
TUCKAHOE, NY

DRAWING TITLE: FOUNDATION PILES
PILE LOAD TEST LAYOUT PLAN

STEPHEN J. FLOOD, P.E.
STATE OF NEW YORK · STEPHEN J. FLOOD · 081665 · LICENSED PROFESSIONAL ENGINEER
NEW YORK PROFESSIONAL ENGINEER LICENSE NUMBER 081665

02/13/17

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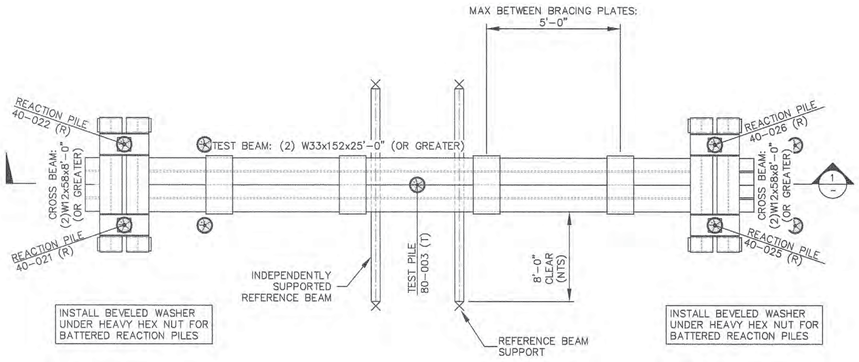
DATE:	02-10-17
PROJECT No.	2017-02
DRAWING BY:	STF
CHECK BY:	JM
SCALE:	AS NOTED
DRAWING No.:	FO-904
CAD FILENAME: 201702fo904.dwg	4 of 5

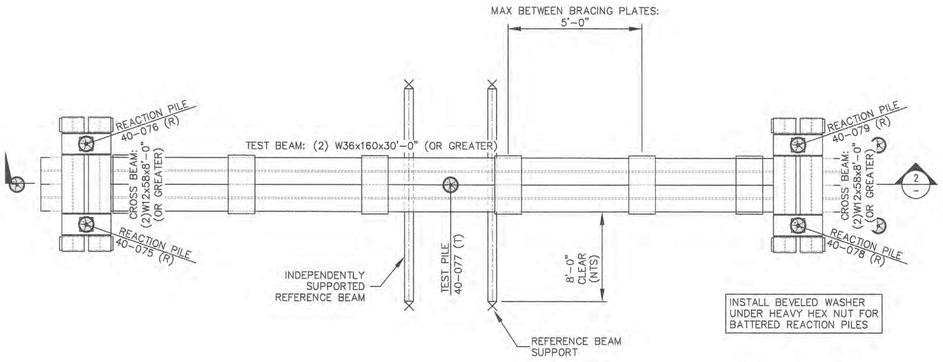
COMPRESSION LOAD TEST CONFIGURATION AND REQUIREMENTS 80 TON ALLOWABLE CAPACITY



PLAN
MICROPILE
COMPRESSION LOAD TEST
FRAME F-1
NTS

SEE DRAWING FO-904 FOR PLAN LOCATIONS

COMPRESSION LOAD TEST CONFIGURATION AND REQUIREMENTS 40 TON ALLOWABLE CAPACITY



PLAN
MICROPILE
COMPRESSION LOAD TEST
FRAME F-2
NTS

SEE DRAWING FO-904 FOR PLAN LOCATIONS

STATIC AXIAL COMPRESSIVE LOAD TEST SCHEDULE
ASTM D 1143
PROCEDURE A; "QUICK TEST"

	PERCENTAGE OF DESIGN LOAD	APPLIED LOAD (TONS) 40 TON PILE	APPLIED LOAD (TONS) 80 TON PILE	LOAD HOLD DURATION (MIN)	LOAD HOLD MOVEMENT READINGS
LOADING CYCLE	AL	1 +/-	2 +/-	5 MINUTES (USE SAME LOAD HOLD DURATION FOR EACH LOADING INCREMENT)	0.5, 1, 2, 4, AND 5 MINUTES AFTER COMPLETING APPLICATION OF EACH LOAD INCREMENT
	10	4	8		
	20	8	16		
	30	12	24		
	40	16	32		
	50	20	40		
	60	24	48		
	70	28	56		
	80	32	64		
	90	36	72		
	DL: 100	40	80		
	110	44	88		
	120	48	96		
	130	52	104		
	140	56	112		
	150	60	120		
	160	64	128		
	170	68	136		
	180	72	144		
	190	76	152		
	MTL: 200	80	160		
UNLOADING CYCLE	180	72	144		
	160	64	128		
	140	56	112		
	120	48	96		
	100	40	80		
	80	32	64		
	60	24	48		
	40	16	32		
	20	8	16		
	AL	1 +/-	2 +/-	1 HOUR	1, 4, 8, 15, 30, 45, AND 60 MINUTES

AL: ALIGNMENT LOAD (ZERO DIAL GAUGES AT START OF TEST)
DL: DESIGN LOAD
MTL: MAXIMUM TEST LOAD

GROSSFIELD MACRI, PC

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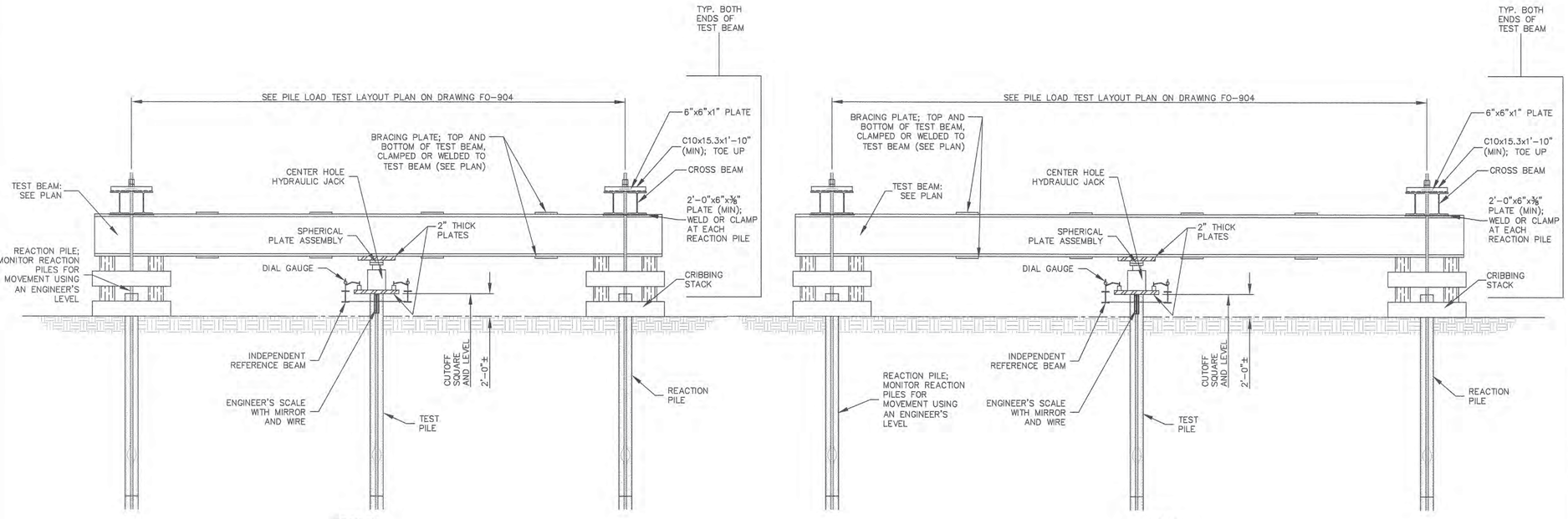
CRR 03/01/17

STATIC COMPRESSIVE LOAD TEST NOTES:
1. SEE ALSO GENERAL NOTES SECTION H ON DRAWING G-901.
2. ALL APPARATUS FOR THE APPLYING AND MEASURING LOADS AND FOR MEASURING MOVEMENT SHALL CONFORM TO ASTM D 1143.
3. THE HYDRAULIC JACK AND PRESSURE GAGE SHALL BE FURNISHED AND CALIBRATED AS A SYSTEM. CALIBRATION SHALL BE CURRENT WITHIN 6 MONTHS. CALIBRATION DATA SHEETS SHALL BE FURNISHED WITH THE JACKING SYSTEM.
4. ADDITIONAL BACKUP MEASURMENTS SHALL BE MADE WITH LASER OR ENGINEER'S LEVEL.
5. REACTION ANCHORS SHALL BE MONITORED USING AN ENGINEER'S LEVEL OR LASER.



SECTION
MICROPILE
COMPRESSION LOAD TEST
FRAME F-1
NTS
1

SECTION
MICROPILE
COMPRESSION LOAD TEST
FRAME F-2
NTS
2

GROSSFIELD MACRI, PC
914-747-4145
203-431-7700

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ENGINEER:
MORRIS-FLOOD ASSOCIATES, LLC
GEOTECHNICAL-CIVIL-STRUCTURAL ENGINEERING
78 ROUTE 173 WEST, SUITE 5, HAMPTON, NJ 08827 ■ TEL: 908-730-8450

CLIENT/PILE CONTRACTOR: ENVIRONMENTAL BULKHEADING
P.O. BOX 460
BRIGHTWATERS, NY 11718

PROJECT: MARRIOTT SPRINGHILL SUITES
109-125 MARBLEDALE ROAD
TUCKAHOE, NY

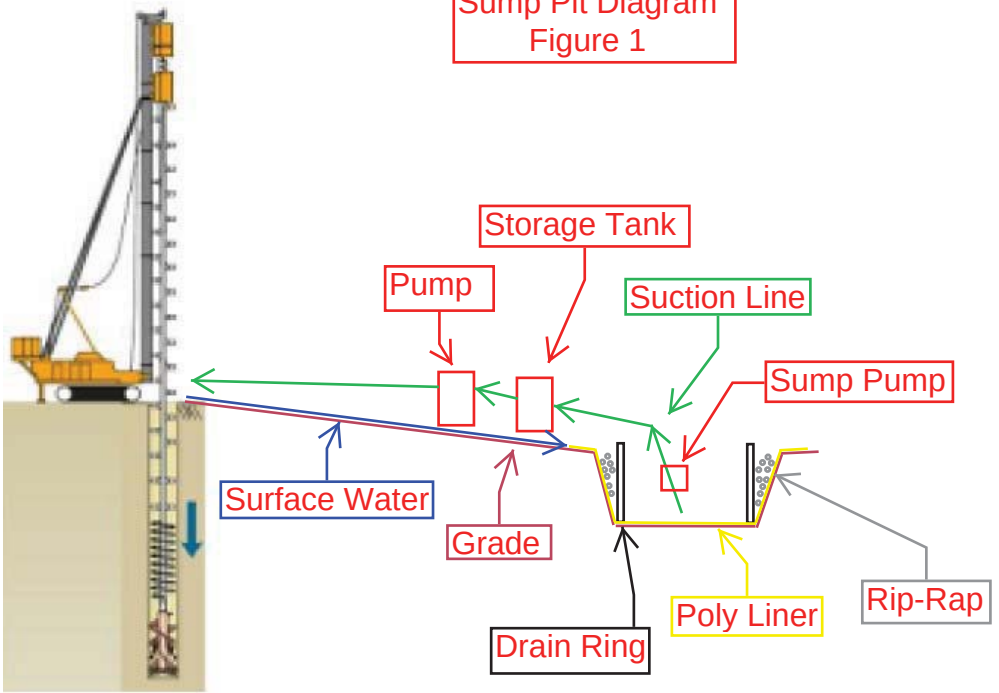
DRAWING TITLE: LOAD TEST ARRANGEMENTS, PLANS AND SECTIONS

STEPHEN J. FLOOD, P.E.
NEW YORK PROFESSIONAL ENGINEER
LICENSE NUMBER 081665

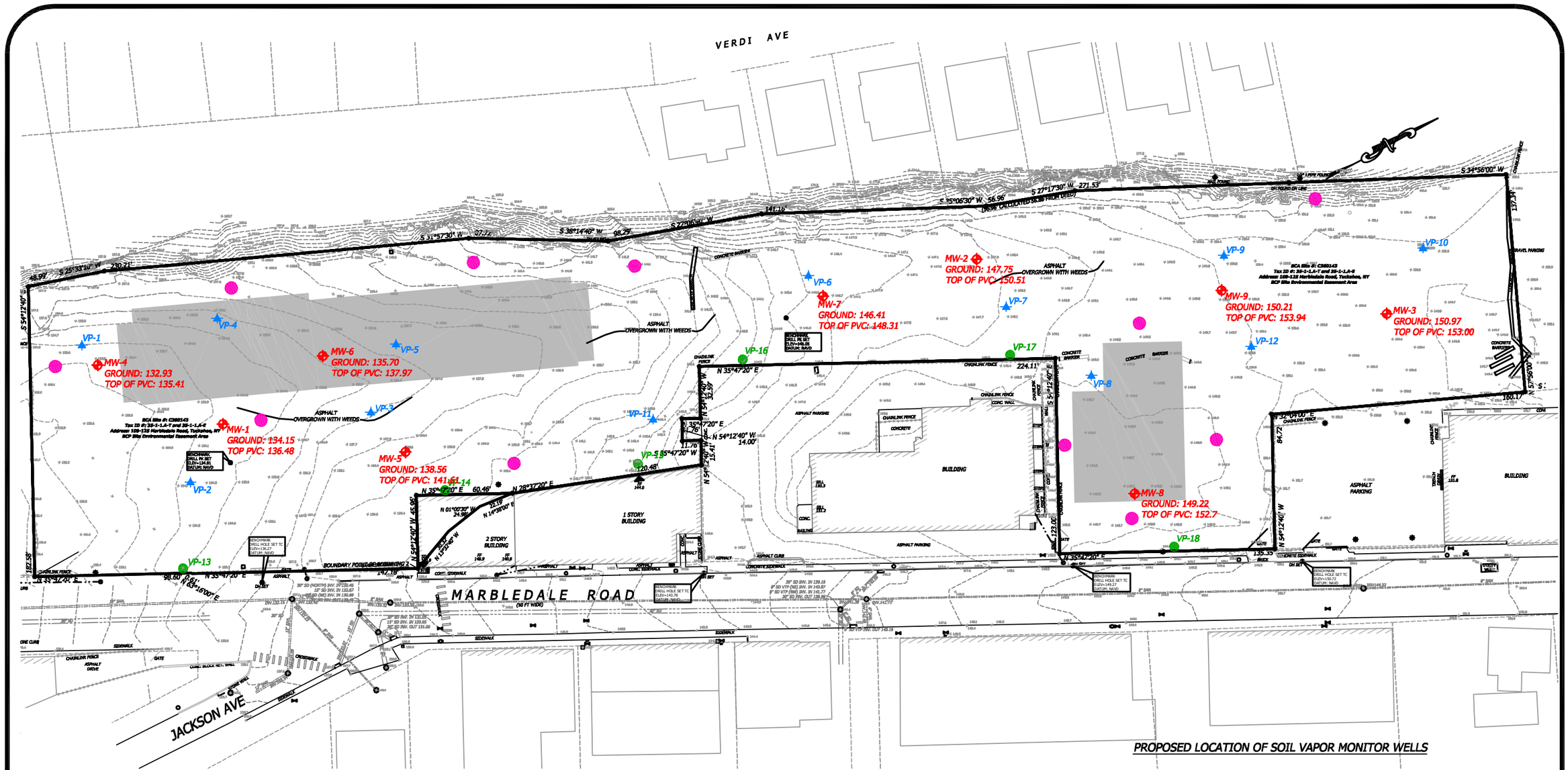
WARNING
IT IS A VIOLATION OF THE LAW FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER AN ITEM ON THIS DRAWING IN ANY WAY. IF AN ITEM IS ALTERED, THE ENGINEER SHALL AFFIX TO THE ITEM HIS SEAL AND THE NOTATION "ALTERED BY" FOLLOWED BY SIGNATURE AND DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION.

DATE:	02-10-17
PROJECT No.	2017-02
DRAWING BY:	STF
CHECK BY:	JM
SCALE:	AS NOTED
DRAWING No.:	FO-905
CAD FILENAME: 201702fo905.dwg	5 of 5

Sump Pit Diagram
Figure 1



Notes:
~50'-100' between drill and basin
~Sump pit(s) to be maintained and monitored to ensure no infiltration
~Additional sump pits to be constructed as needed

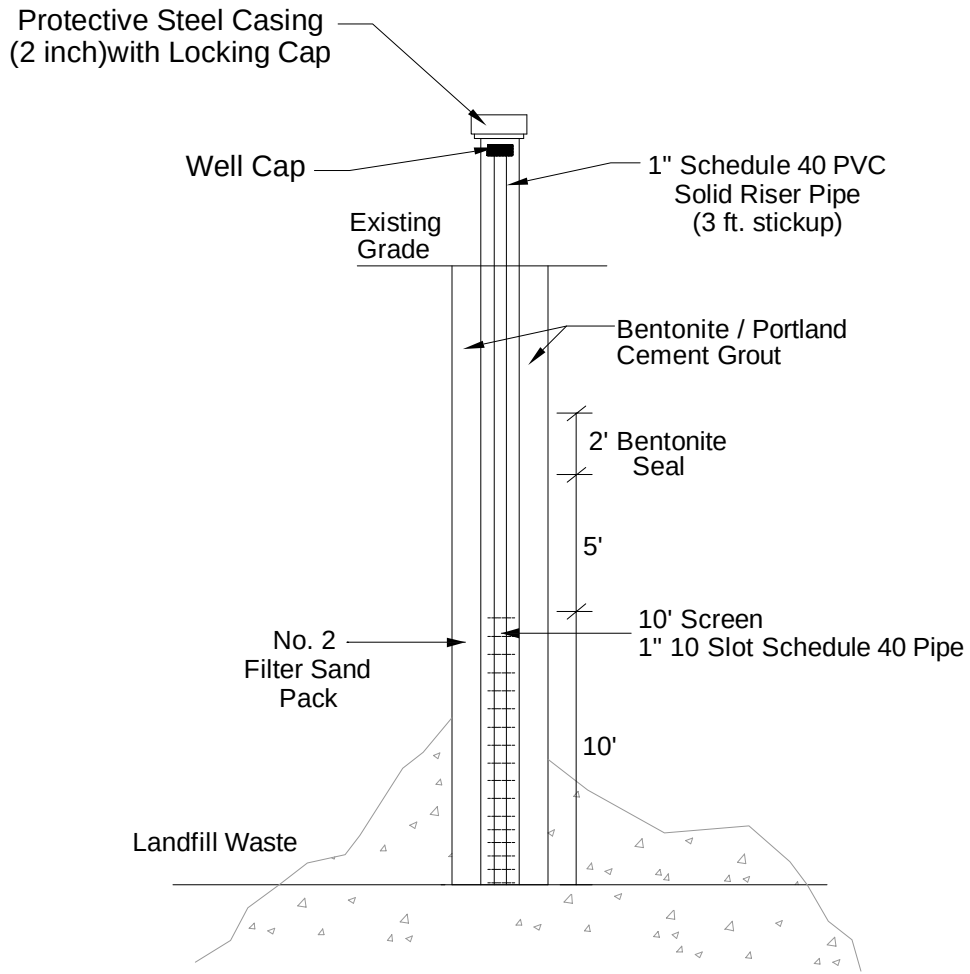


SITE PLAN

SCALE: 1" - 20'

FIGURE ADAPTED FROM SURVEY BY MR. MICHAEL W. FINKBEINER

109-125 MARBLEDALE ROAD TUCKAHOE, NEW YORK	SITE PLAN	REVISED FIGURE 2	HydroEnvironmental SOLUTIONS, INC. One Deans Bridge Road Somers, New York 10589



FORMER MARBLE QUARRY SVE MONITORING
WELL POINT DESIGN

FIGURE 3

MARBLEDALE ROAD TUCKAHOE, NEW YORK	SOIL VAPOR MONITORING WELL DETAIL	Not to Scale	MAY 2017	HydroEnvironmental SOLUTIONS, INC. One Deans Bridge Road Somers, New York 10589
		SOIL VAPOR MONITOR WELL DETAILS		

Pile and Pile Cap Installation Work-Flow
Schedule is approximate and will be adjusted in the field

Drill Rig 1 Work flow South to North

Drill Rig 2 Work flow South to North

Week 1 Install test piles
Week 2 Install piles
Week 4 Install pile caps
Week 5 Install grade beams

Week 3 Install piles
Week 5 Install pile caps
Week 6 Install grade beams

Week 4 Install piles
Week 6 Install pile caps
Week 7 Install grade beams

Week 5 Install piles
Week 7 Install pile caps
Week 8 Install grade beams

Week 6 Install piles
Week 8 Install pile caps
Week 9, 10 Install grade beams

Week 7 Install piles
Week 9 Install pile caps
Week 11,12 Install grade beams

FRAMED CONCRETE SLAB PLAN

SCALE: 3/32" = 1'-0"

NOTES

1. DATUM FOR ALL ELEVATIONS SHOWN ON PLAN OR SECTIONS IS TOP OF FIRST FLOOR SLAB ELEVATION +0. FOR ACTUAL ELEVATIONS SEE ARCHITECTURAL DRAWINGS.
2. TOP OF SLAB IS @ UNLESS OTHERWISE NOTED THUS ▭ ON PLAN.
3. ▭ DENOTES DIRECTION OF FRAMING - SEE CONCRETE SLAB SCHEDULE AND DETAILS FOR REINFORCEMENT.
4. FOR REBAR INSTALLATION SEE SCHEDULE.
5. PRIOR TO START OF WORK CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS SHOWN ON DRAWINGS AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES THAT COULD AFFECT THE INDICATED WORK.

CONCRETE SLAB SCHEDULE

MARK	THICKNESS INCHES	BOTTOM REINFORCING	TOP REINFORCING	TEMPERATURE REINFORCING
S1	8	#5 @ 12	#5 @ 12	#4 @ 15, TBB
S2	8	#5 @ 8	#5 @ 8	#4 @ 15, TBB

REBAR INSTALLATION SCHEDULE

1.	BOTTOM REINFORCING NORTH/SOUTH
2.	BOTTOM TEMPERATURE REINFORCING EAST/WEST
3.	TOP TEMPERATURE REINFORCING EAST/WEST
4.	TOP REINFORCING NORTH/SOUTH

PILE FOUNDATION PLAN

SCALE: 3/32" = 1'-0"

NOTES

1. DATUM FOR ALL ELEVATIONS SHOWN ON PLAN IS TOP OF FIRST FLOOR SLAB ELEVATION +0. FOR ACTUAL ELEVATIONS SEE ARCHITECTURAL DRAWINGS.
2. TOP OF SLAB IS @ UNLESS OTHERWISE NOTED THUS ▭ ON PLAN.
3. TOP OF WALLS OR GRADE BEAMS IS +10" UNLESS OTHERWISE NOTED THUS +x , - ON PLAN.
4. BOTTOM OF GRADE BEAMS IS -1'-10" UNLESS OTHERWISE NOTED THUS (—) ON PLAN.
5. TOP OF PILE CAPS ARE 3" BELOW BOTTOM OF DEEPEST ADJACENT GRADE BEAM UON THUS (3) ON PLAN.
6. BEL PLATES SHALL BE FASTENED TO CONCRETE WITH 5/8"Ø BOLTS AT 12" O.C. IF GROUT IS USED IN LIEU OF ANCHOR BOLTS PROVIDE 6" EMBEDMENT.
7. ALL CONCRETE PIERS SHALL BE 24" X 24" X 36" W (4) #6 VERT. AND #4 TIES AT 12"OC UNLESS OTHERWISE NOTED ON PLAN.
8. ALL CONCRETE BUTTRESSES SHALL BE 24" X 24" X 36" W (4) #6 VERT. AND #3 TIES AT 12"OC UNLESS OTHERWISE NOTED ON PLAN.
9. PILE CAPS SHALL BE CENTERED UNDER COLUMNS OR GRADE BEAMS UNLESS OTHERWISE NOTED ON PLAN.
10. SYMBOL ⊙—▶ DENOTES A BATTERED PILE, BATTER IS 1 :12 (1 FOOT) ON.
11. PRIOR TO START OF WORK CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS SHOWN ON DRAWINGS AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES THAT COULD AFFECT THE INDICATED WORK.

LAP SPLICE SCHEDULE (INCHES)

BAR SIZE	BOTT. BARS 3'-0"	BOTT. BARS 5'-0"	TOP BARS 3'-0"	TOP BARS 5'-0"
#4	20	20	30	24
#5	25	24	36	30
#6	30	28	45	36
#7	45	36	62	50
#8	56	46	82	66
#9	74	60	104	84

NOTES:
BOTTOM BARS MAKE LESS THAN 12 INCHES OF CONCRETE BELOW THE BAR.
TOP BARS HAVE MORE THAN 12 INCHES OF CONCRETE BELOW THE BAR.
"B" IN THE BAR SPACING.

LEGEND

- INTERIOR BEARING WALL
- NON-BEARING WALL
- HOLD-DOWN ANCHOR
- PSL WOOD POST
- WOOD POST ABOVE
- EXTENSION OF FRAMING
- SINGLE PILE
- SINGLE BATTERED PILE

MINIMUM CONCRETE COVER FOR STEEL REINFORCEMENT, IN.

CONCRETE CAST AGAINST EARTH	3
CONCRETE EXPOSED TO EARTH OR WEATHER	
#6 AND LARGER	2
#5 AND SMALLER	1 1/2
CONCRETE NOT EXPOSED TO EARTH OR WEATHER	
SLABS, WALLS & JOISTS (#11 AND SMALLER)	3/4
BEAMS AND COLUMNS	1 1/2

SHEAR WALL SCHEDULE

	TYPE	SHEATHING	EDGE NAILING	BLOCKED DIAPHRAM	FIELD NAILING	HOLD DOWN AT BOUNDARIES	BOUNDARY STUDS	STRAPPING AROUND OPENINGS
①	SW1	(1) 800D @ STRUCTURAL WOOD PANELS	8d @ 4" O.C. (0.131 x 1 1/2")	YES	8d @ 12" O.C. (0.131 x 1 1/2")	HDU8 - SDS2.5 WALL TO WALL HDU8 - SDS2.5 WALL TO CONC.	(2) 2x6	YES
②	SW2	(2) 5/8" GYPSUM BOARD BOTH SIDES	0.12" NAIL, MIN. 3" HEAD, 5/8" LONG, 7" O.C.	YES	0.12" NAIL, MIN. 3" HEAD, 5/8" LONG, 7" O.C.	HDU8 - SDS2.5 WALL TO WALL HDU8 - SDS2.5 WALL TO CONC.	(2) 2x6	YES

CONCRETE BEAM SCHEDULE

MARK	"A" INCHES	"B" INCHES	"C" INCHES	"D" INCHES	CONT. BOTTOM REINFORCING	CONT. TOP REINFORCING	STIRRUPS MIN. DISTANCE OF SUPPORT	STIRRUPS REMAINING SPAN	NOTES
B1	36	16	3	1 1/2	(2) #7	(2) #7	#4 ∪ @ 6	#4 ∪ @ 12	SEE PLAN FOR ADDED BARS & STIRRUPS
B2	36	12	4	2 1/2	(2) #6	(2) #6	#4 ∪ @ 6	#4 ∪ @ 16	
B3	36	12	3	1 1/2	(2) #6	(2) #6	#4 ∪ @ 6	#4 ∪ @ 16	

CONT. TOP REINFORCING
STIRRUP
CONT. BOTTOM REINFORCING

FOR PERMIT
02/03/17

Scope Attachments Page 12 of 26
05/09/2017

GMCE PC
Consulting Mechanical Engineers, PC
73 Saint Antoine, Monroe, NY 10950 914.767.1148
344 Saddlebow Hills Road, Rochester, CT 06877 203.431.2700
www.GMCEPC.com

MARRIOTT HOTEL
TUCKAHOE, NY

FOUNDATION PLAN

Issued	Date	By
1	02/03/17	CRR

Project No. 16-013
Checked By MAM
Drawn By CRR
Scale AS NOTED
Drawing S-100
Date 02/03/17
Sheet 1 OF 10 SHEETS

M9-1

HYDRAULIC CRAWLER DRILL

PERFORATRICE IDRAULICA

M9-1

HYDRAULIC CRAWLER DRILL

The M9-1 hydraulic crawler drill, another step forward in our production of the world's best drilling rigs. Tougher, more powerful, more versatile than before, this machine provides better performance in the execution of all small bore drill holes. The key to its high maneuverability is in the kinematics of the new mast and mast support system which make it easy to set-up even in the most confined sites. The control panels and supports have been carefully engineered for comfort and good all-round operator visibility. A model of efficiency and performance, the M9-1 with its new, powerful, diesel engine and high capacity hydraulics, can be tailored to the individual needs of the contractor. Built safe is manufactured to comply requirements on quality. Safety features include a number of emergency stop devices and protective barriers to all moving parts.

La M9-1 perforatrice idraulica rappresenta un altro passo in avanti nella nostra produzione delle migliori perforatrici al mondo. Questa macchina risulta essere leggera versatile e particolarmente indicata per lavori di ancoraggio. Dispone di un arco di movimentazioni che permette all'operatore di ottenere sempre la posizione ideale anche in cantieri con spazi angusti. I comandi sono servo assistiti idraulicamente e montati su di un braccio orientabile snodato. La loro distribuzione è stata studiata accuratamente per una facile individuazione delle operazioni eseguibili. L'efficienza della perforatrice M9-1, con un nuovo motore e elevate prestazioni idrauliche, deriva innanzitutto dalla modularità dei componenti con cui, in funzione delle varie esigenze, viene attrezzata. Progettata tenendo conto della sicurezza dell'operatore, dotandola di protezioni in tutte le sue parti in movimento e di dispositivi di sicurezza.

UNDERCARRIAGE	CARATTERISTICHE CARRO	
Overall width of undercarriage	Larghezza sottocarro	2500 mm
Track shoes width	Larghezza pattini	500 mm
Overall track length	Lunghezza cingoli	3235 mm
Travel speed	Velocità di traslazione	0 ÷ 1,8 km/h
Max. gradeability	Pendenza max. superabile	20°
Ground pressure	Pressione specifica al suolo	75 kPa
Oscillating tracks	Oscillazione cingoli	+13° / –10°
ENGINE	**MOTORE**	**DEUTZ**
Model	Modello	TCD 2012 L06 2V (EPA/COM III)
Rated power at 2300 rpm	Potenza a 2300 giri	147 kW
Fuel tank capacity	Capacità serbatoio gasolio	200 l
Hydraulic oil tank capacity	Capacità serbatoio olio idraulico	700 l

MAST	MAST	4400	6500
Mast length	Lunghezza mast	6300 mm	8400 mm
Stroke of rotary head	Corsa testa di rotazione	4400 mm	6500 mm
Extraction force	Forza di estrazione	85 kN	85 kN
Crowd force	Spinta sull'utensile	50 kN	50 kN

CLAMPS	MORSE	M2Z/M2SZ	M4/M4S	M5/M5S
Diameter	Diametro	40 ÷ 254 mm	60 ÷ 305 mm	90 ÷ 406 mm
Clamping force	Forza di chiusura	145 kN	250 kN	250 kN

ROTARY HEAD	TESTA DI ROTAZIONE	T2500	T3000	T5000
Max. torque	Coppia max.	20000 Nm	30000 Nm	55000 Nm
Max. speed	Giri max.	215 rpm	160 rpm	50 rpm

DIMENSIONS AND WEIGHT	INGOMBRI E PESO	A	B
Length	Lunghezza	8545 mm	9707 mm
Width	Larghezza	2500 mm	2500 mm
Height	Altezza	2850 mm	2850 mm
Weight of rig*	Peso attrezzatura*	~ 18000 kg	~ 18500 kg

* Depending on mounted equipment

* Dipende dall'allestimento montato

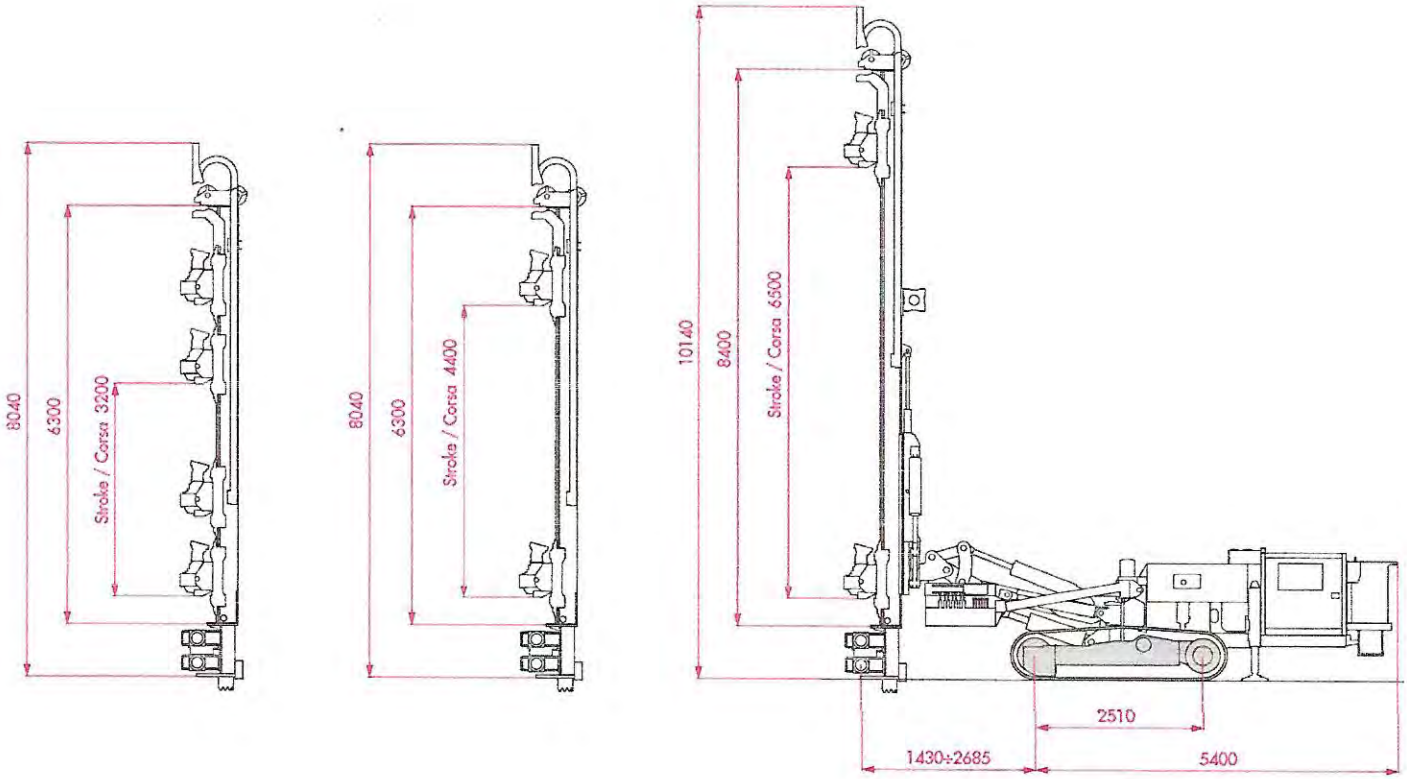
OPTIONALS
OPZIONI

Casagrande hammer D21	Martello Casagrande D21
Other rotary heads and hammers on request	Altre teste e martelli su richiesta
Hydraulic chuck P114 / P200	Mandrino P114 / P200
Sliding breaking unit clamp	Morsa scorrevole
2-rods loader - max. 140 mm	Caricatore 2 aste - max. 140 mm
Rod carousel for 7 rods – only vertical use	Caricatore 7 aste – uso verticale
A2 type hydraulic service winch, line pull 20 kN	Argano di servizio A2, tiro 20 kN
Rear stabilizers	Stabilizzatori posteriori
Hydraulically operated rotation for control panel	Rotazione idraulica del pulpito
15 m lattice extension for jet grouting	Prolunga tralicciata 15 m per jet grouting
Cathead extension L = 2,5 m	Prolunga falchetto L = 2,5 m
Service crane available: 245 kg at 7,45 m	Gru di servizio: 245 kg a 7,45 m
Screw pump for foam flushing type NG530L: 24 bar - 170 l/min	Pompa a vite per fango tipo NG530L: 24 bar - 170 l/min
Foam pump type C35: 50 bar - 30 l/min	Pompa schiumogeni tipo C35: 50 bar - 30 l/min
Triplex water pump type P246: 40 bar - 200 l/min	Pompa triplex per acqua tipo P246: 40 bar - 200 l/min
Core ejection pump	Pompa scarotatrice

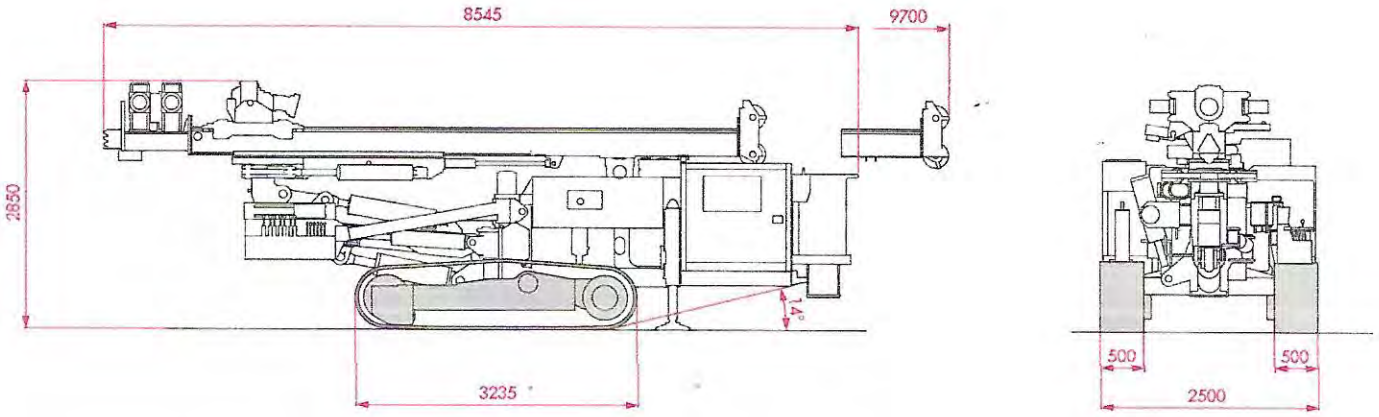
MAST 6300/4400
DOUBLE ROTARY HEAD
DOPPIA TESTA

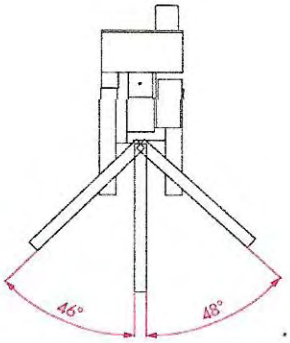
MAST 6300/4400
CYLINDER FEED
CILINDRO

MAST 8400/6500
CYLINDER FEED
CILINDRO



TRANSPORT DIMENSIONS
DIMENSIONI DI TRASPORTO

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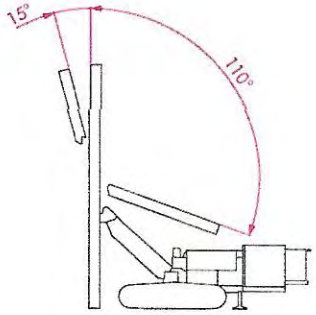
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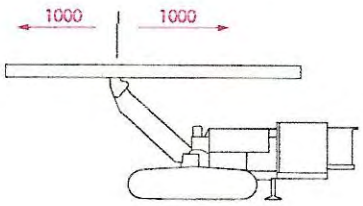
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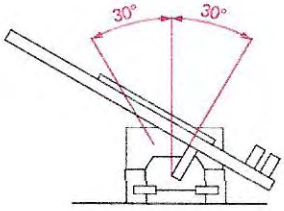
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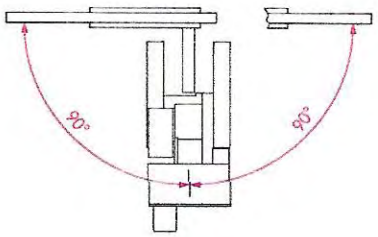
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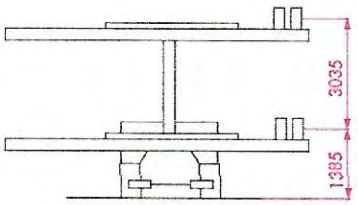
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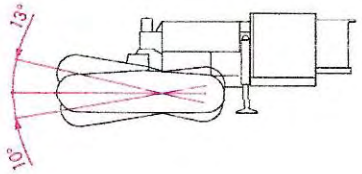
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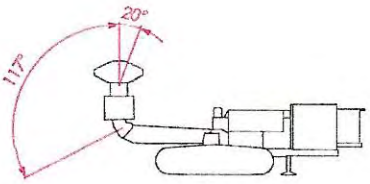
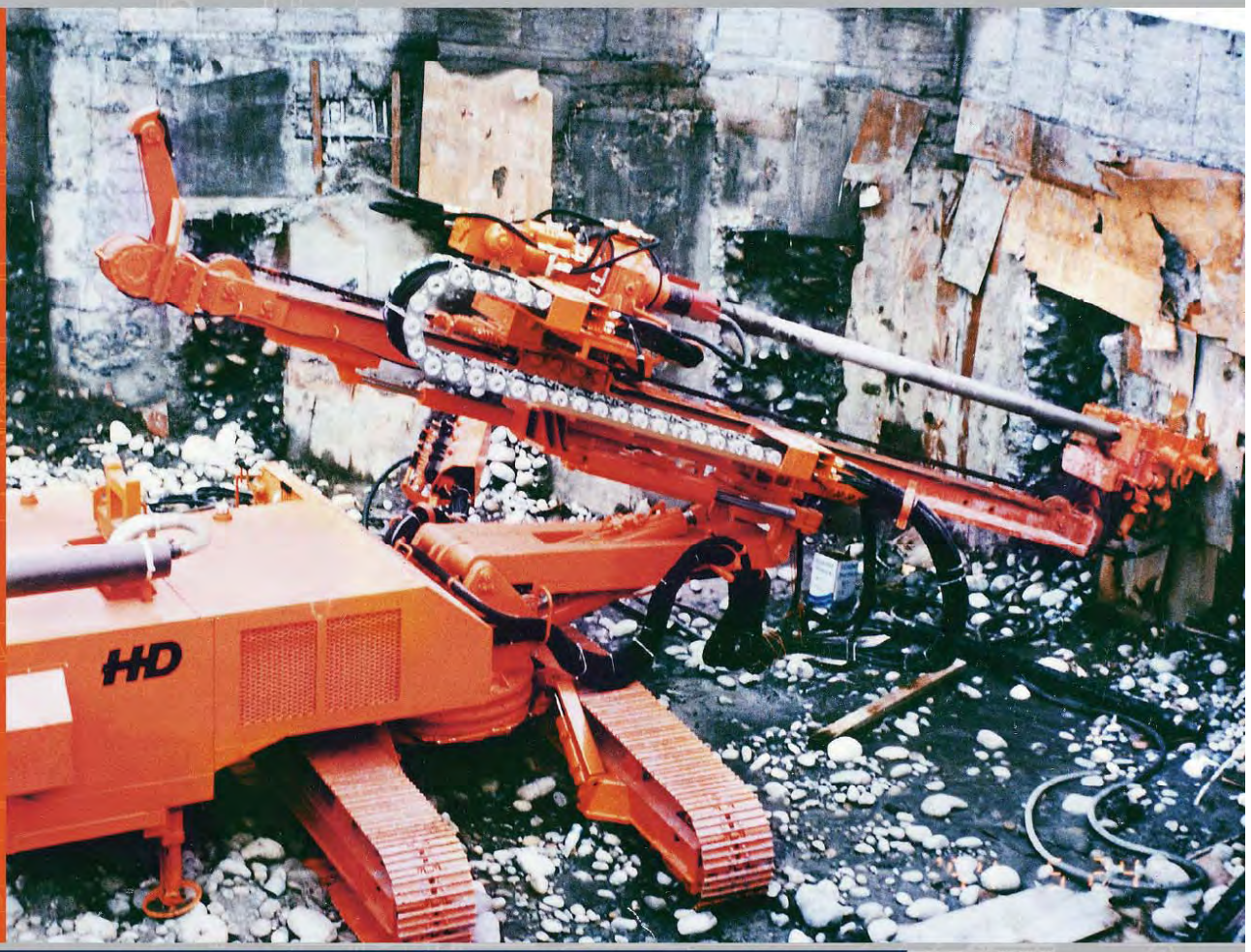

20°
117°



HD180 Hydraulic Crawler Drill
Vollhydraulisches Bohrgerät

HD ENGINEERING LTD.

"Jack Step" Movement
Hub-Dreh-Bewegung

Turn Right — Rechts herum

Off the Ground — Schweben

Turn Left — Links herum

HD180 is a compact and sturdy drill rig. Having a turntable and a large variety of movements on the drill mast, this versatile drill rig can reach different drilling angles very easily and quickly. With the 173 HP engine providing the powerful and efficient hydraulic system, the heavy-duty drill mast with high-torque rotator (up to 3,900 kgm), coupled with flexible movements, the drill rig is designed and built for different large diameter drilling systems and different drilling environments.

Die **HD180** ist ein kompaktes und robustes vollhydraulisches Raupenbohrgerät. Mit Drehkranz und den Bewegungs-möglichkeiten des Bohrmasts, kann dieser vielseitige Bohrwagen schnell und einfach verschiedene Winkel bohren. Ein 173PS/ 128KW Dieselmotor versorgt das kraftvoll-effiziente Hydrauliksystem und den KDK mit hohem Drehmoment (bis 39000Nm). Der starke Bohrturm, gekoppelt mit den flexiblen Bewegungen, machen das Bohrgerät ideal für verschiedenste Einsatzmöglichkeiten mit unterschiedlichen Bohrsystemen großen Durchmessers.

Hydraulic Drifter
Hydraulikhammer

Providing Rotary and Percussive Power
Für drehschlagendes Bohren

Hydraulic Rotator
Kraftdrehkopf

Providing Rotary Power
Für Rotary- und Spülbohren

Hydraulic Double Clamp
Doppelte Abfangvorrichtung

Disconnecting the Casing and Drill Pipe
Obere Klemme zum Brechen

Control Panel
Steverstand

Control the Movement and Drilling Function
Bohr-und Bewegungsfunktionen

Standard Machine Specification
Standardausführung

HD180 Hydraulic Crawler Drill
HD180 Vollhydraulisches Bohrgerät

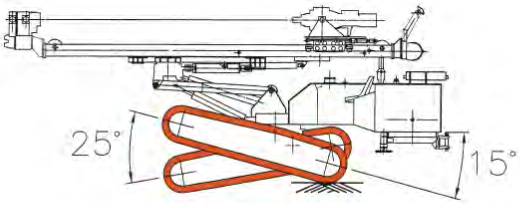
HD ENGINEERING LTD.

Service Weight *Gesamtgewicht*	Approx. 12,000 kg		(26,400 lb)	ca. 12.000 kg	
Drive *Antrieb*	Diesel Engine Power Rating = 129 kW (173HP) at 2,200 rpm			Dieselmotor 129 kW (173HP) bei 2.200 U/min	
Hydraulic System *Hydraulikpumpen*	Tandem Gear Pump Max. Pressure 250 Bar Q1 = 130l/min. Q2 = 130l/min. Q3 = 37l/min. Q4 = 37l/min.		 (3,625 psi) (34.3 gpm) (34.3 gpm) (9.8 gpm) (9.8 gpm)	Tandem Zahnradpumpen Systemdruck 250 Bar Q1 = 130 l/min. Q2 = 130 l/min. Q3 = 37 l/min. Q4 = 37 l/min.	
Hydraulic Oil Tank *Hydrauliköltank*	Capacity 370 l		(98 gal)	ca. 370 l	
Fuel Tank *Kraftstofftank*	Capacity 180 l		(47.5 gal)	ca. 180 l	
Mast and Feed Assembly *Bohrmast*	Mast Length Stroke Length Feed Force Pullback Force Feed Speed Retract Speed	: 6,000 mm : 4,100 mm : 5,600 kg : 8,000 kg : 1.02 m/s : 0.71 m/s	(19.7 ft) (13.5 ft) (12,320 lb) (17,600 lb) (201 ft/min) (140 ft.min)	Mastlänge Hub Andruck Hubkraft Vorschub (max.) Rückzug (max.)	:6.000 mm :4.100 mm :56.000 N :80.000 N :1,02 m/s :0,71 m/s
Rotator *Kraftdrehkopf*	Model Max. Rotary Speed Max. Torque	: HR2400 : 87 rpm : 23,400 Nm	 (16,885 ft.lb)	Modell Max. Drehzahl Max. Drehmoment	: HR2400 : 87 U/min : 23.400 Nm
Drifter *Hydraulikhammer*	Model Impact Rate Max. Rotary Speed Max. Torque	: HB50A : 2,400 min^{-1} : 80 rpm : 12,980 Nm	 (9,548 ft.lb)	Modell Schlagzahl Max. Drehzahl Max. Drehmoment	: HB50A : 2.400 min -1 : 80 U/min : 12.980 Nm
Winch *Seilwinde*	Max. Line Pull Max. Speed	: 2,040 kg : 24.1 m/min	(4,488 lb) (79 ft/min)	Max. Zugkraft Max. Geschwindigkeit	: 2.040 kg : 24,1 m/min
Clamp *Abfangklemme*	Model Max. Clamping Dia. Clamping Force	: MOD179 : 368mm : 23,200 kg	 (14.5") (51,040 lb)	Modell Max.Klemmdurchmesser Klemmkraft	: MOD179 : 368 mm : 232.000 N
Crawler Undercarriage *Raupenunterwagen*	Ground Pressure Travelling Speed Climbing Ability	: 0.58 kg/cm^2 : 0-3.0 km/h : 30°	(8.2 psi) (0-1.8 mph)	Max. Bodenpressung Geschwindigkeit Steigfähigkeit	: 0,58 kg/cm^2 : 0-3,0 km/h : 30°
Dimensions *(while mast down to horizontal)* *Transportabmessungen* *(Bohrmast Abgeklappt)*	Length Width Height	: 6,800 mm : 2,230 mm : 3,350 mm	(22.3 ft) (7.3 ft) (11ft)	Länge Breite Höhe	: 6.800 mm : 2.230 mm : 3.350 mm

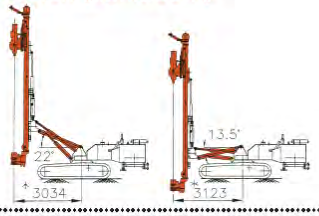
Note : Specifications are subject to change without notice in accordance with HD Engineering's Policy of continuing development.
Änderungen der in dieser Broshüre enthaltenen Angaben behalten wir uns im Zuge einer kontinuierlichen Weiterentwicklung vor.

Articulation Schematics
Bewegungsschema

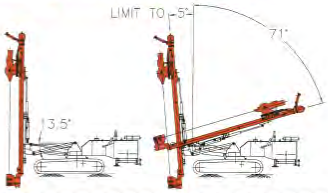
Oscillating Range of Tracks
Pendelgrad der Raupen



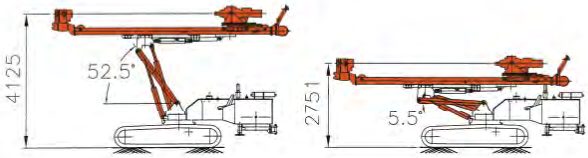
Mast Tilting Range (Vertical Position)
Mastschwenkungsbereich (senkrecht)



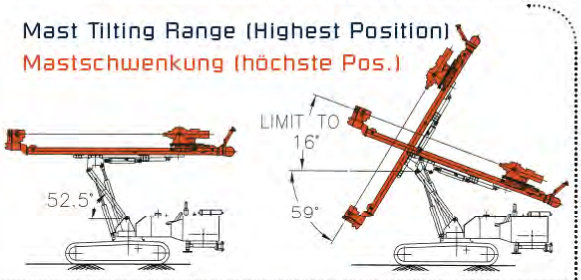
Mast Tilting Range (Lowest Position)
Mastschwenkung (niedrigste Pos.)



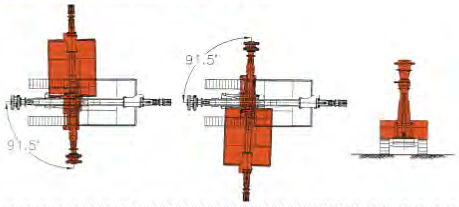
Mast Tilting Range (Horizontal Position)
Mastschwenkungsbereich (waagerecht)



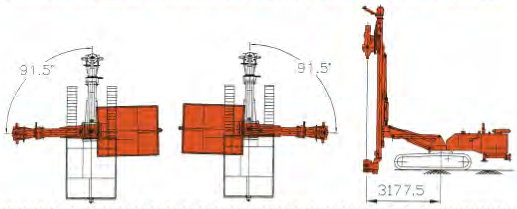
Mast Tilting Range (Highest Position)
Mastschwenkung (höchste Pos.)



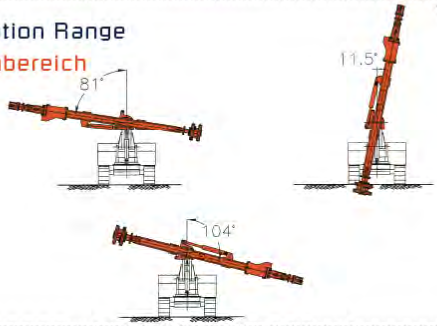
Turn Table Range
Drehkranz-Bewegungsbereich



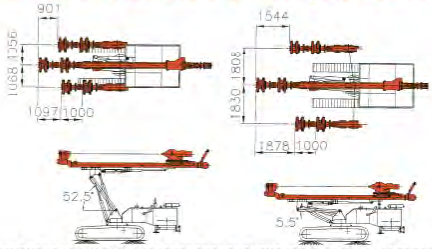
Turn Table Range (Max. Radius of Vertical Drilling)
Drehkranzbereich (max.Radius Senkrechtbohren)



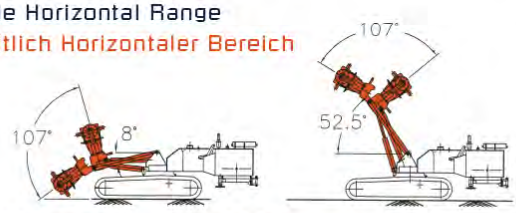
Mast Rotation Range
Mast Drehbereich



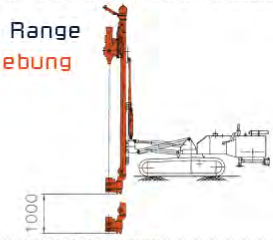
Face Drilling Range (Highest and Lowest Position)
Frontalbohren (höchste und niedrigste Position)



Side Horizontal Range
Seitlich Horizontaler Bereich



Mast Shifting Range
Höhenverschiebung



All Dimensions in mm Alle Maße in mm

Note : Specifications are subject to change without notice in accordance with HD Engineering's Policy of continuing development.

Änderungen der in dieser Broschüre enthaltenen Angaben behalten wir uns im Zuge einer kontinuierlichen Weiterentwicklung vor

Job Site Photos
Einsatzfotos

Applications — Anwendungen

- Foundation Piles Hole — Pfahlbohrung
- Retaining Wall Drilling — Spundwand-Bohrung
- Pre-boring for Piles — Vorbohren von Pfählen
- Soil Nail Hole — Erdnagel
- Anchor Hole — Ankerloch
- Water Drainage Hole — Drainage-Bohrung
- Anchor Drilling — Ankerbohren

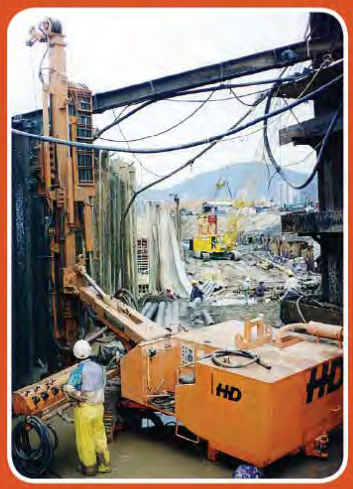
Taiwan - Anchor Hole Drilling ø133.0mm
Taiwan - Ankerbohren ø133.0mm

China - Anchor Hole ø133.0mm
China - Ankerbohren ø133.0mm

Cyprus - Soil Investigation Core Drilling
Zypern - Bodenuntersuchung Kernbohrung

Hong Kong - Mirco Pile ø508.0mm
Hong Kong - Mikropfahl ø508.0mm

Germany - Horizontal Drilling ø156.0mm
Deutschland - Horizontalbohren ø156.0mm



Hong Kong
- Pipe Pile ø219.0mm
Hong Kong
- Schlitzwand ø219.0mm

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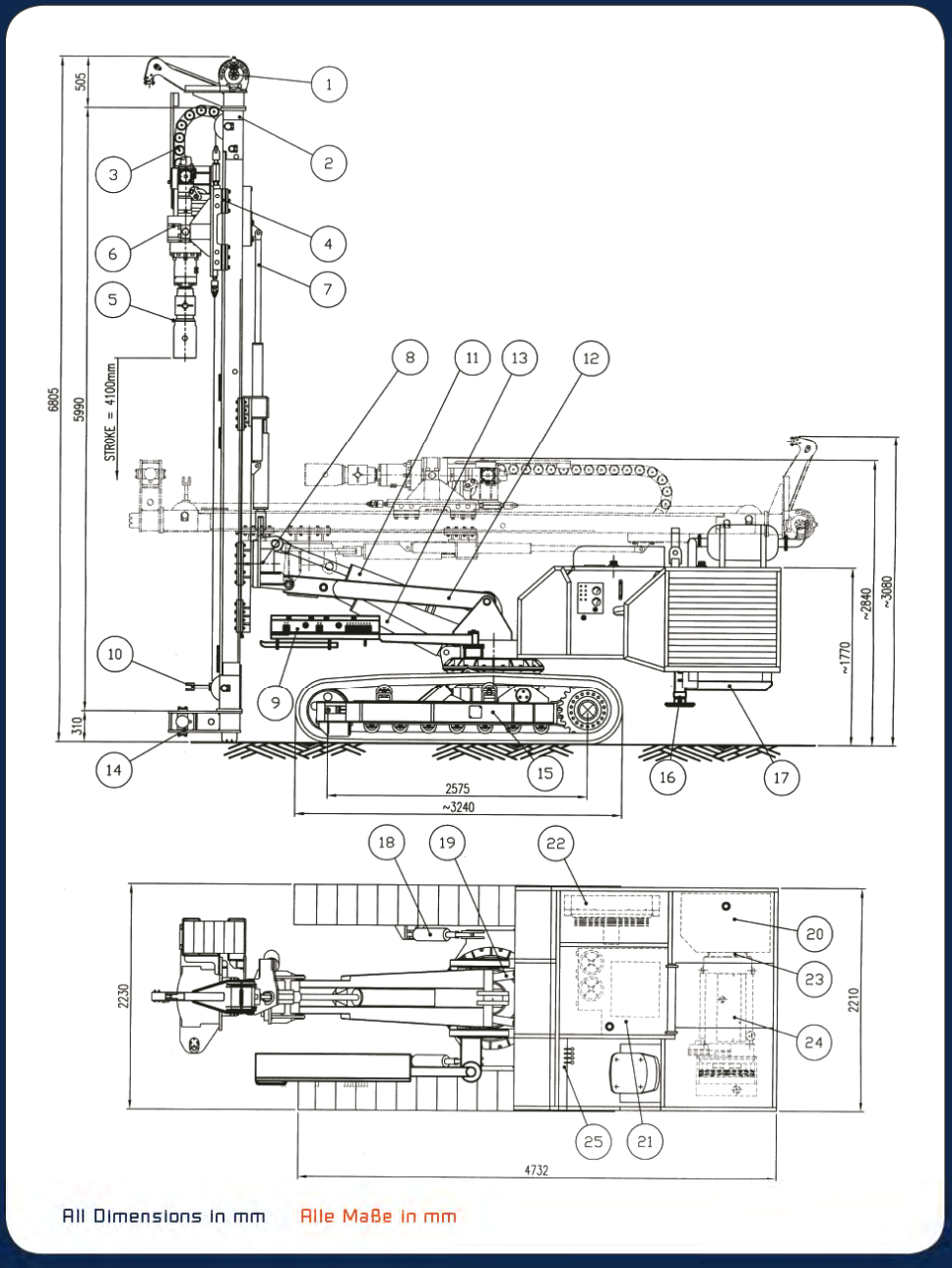
Machine Diagram
Maschinenzeichnung

Label Nr.	Description / Beschreibung
1.	Mast Top Winch Masttop-Winde
2.	Mast Assembly Bohrmast
3.	Hose Guide Assembly Schlauchführung
4.	Guide Carriage Assembly Vorschubsystem
5.	Flushing Head Assembly Spülkopf
6.	Drifter Hydraulikhammer
7.	Mast Shifting Cylinder Mastverschiebezylinder
8.	Mast Rotation Device Mastdrehvorrichtung
9.	Control Arm Auschwenkbares Steuerpult
10.	Break-out-tong Assembly Ausbrechzange
11.	Mast Tilting Cylinder Mastkippzylinder
12.	Boom Schwenkarm
13.	Boom Raising / Lowering Cylinder Arm Hebe-und Senk-zylinder
14.	Hydraulic Retaining Clamp Hydr. Abfangklemme
15.	Crawler Undercarriage Assembly Raupenunterwagen
16.	Levelling Jack Hydr. Abstützstempel
17.	Upper Structure Maschinenaufbau
18.	Pendulum Cylinder Pendelzylinder
19.	Turntable Assembly Drehtisch
20.	Fuel Tank Kraftstofftank
21.	Oil Tank Öltank
22.	Oil Cooler Ölkühler
23.	Pump Set Pumpen
24.	Diesel Engine Dieselmotor
25.	Crawler & Engine Control Panel Raupen-und Motor-Schaltpult



All Dimensions in mm Alle Maße in mm

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GROUND IMPROVEMENT - GENERAL NOTES

1. THE PROPOSED BUILDINGS WILL BE SUPPORTED ON PILE FOUNDATIONS THAT ARE DRILLED INTO BEDROCK BELOW THE EXISTING FILL AND DEBRIS LAYERS. ALL SPOILS FROM THE PILE DRILLING OPERATION SHALL EITHER BE REUSED AS FILL ON THE SITE OR PROPERLY DRUMMED AND REMOVED FROM THE SITE, DEPENDING ON THE EVALUATION AND REQUIREMENTS OF THE ENVIRONMENTAL CONSULTANT.

2. WHERE THE SIDEWALKS, PAVEMENT, RETAINING WALLS, AND/OR UTILITIES ARE UNDERLAIN BY FILL MATERIAL WITH ASH AND DEBRIS, SETTLEMENT IS EXPECTED. TO REDUCE THE POTENTIAL FOR DAMAGING DIFFERENTIAL SETTLEMENTS, GROUND IMPROVEMENT MEASURES WILL BE REQUIRED FOR THE SITE. THE ANTICIPATED GROUND IMPROVEMENT AREAS ARE HIGHLIGHTED ON THIS PLAN.

3. THE IMPROVEMENT MEASURES WILL CONSIST OF A COMBINATION OF THE FOLLOWING:

   A. RAPID IMPACT COMPACTION (RIC)
   B. OVER-EXCAVATION AND REPLACEMENT OF FILL WITH GEOGRID REINFORCEMENT

4. EACH OF THE ABOVE GROUND IMPROVEMENT MEASURES IS DISCUSSED IN MORE DETAIL BELOW.

- AREAS WHERE RAPID IMPACT COMPACTION (RIC) WILL BE REQUIRED TO IMPROVE THE SUBGRADE SOILS.
- AREAS WHERE OVER-EXCVAATION OF THE FILL AND DEBRIS IS ANTICIPATED. THE SUBGRADE WILL BE STABILIZED WITH GEOGRID REINFORCEMENT AND NEW COMPACTED FILL AS SHOWN ON DETAIL 1 ON THIS SHEET.
- AREAS WHERE RAPID IMPACT COMPACTION (RIC) AND OVER-EXCAVATION OF THE FILL AND DEBRIS WILL BE REQUIRED. AFTER RIC, THE SUBGRADE WILL BE STABILIZED WITH GEOGRID REINFORCEMENT AND NEW COMPACTED FILL.

5. COMMUNITY AIR MONITORING WILL BE PERFORMED, AS REQUIRED BY THE ENVIRONMENTAL CONSULTANT, DURING ALL PILE INSTALLATION AND GROUND IMPROVEMENT WORK.

6. IF REQUIRED, DUST IS TYPICALLY MANAGED BY APPLICATION OF PHYSICAL COVERS AND/OR BY WATER SPRAYS. ODORS ARE TYPICALLY CONTROLLED BY LIMITING THE AREA OF OPEN EXCAVATION, PHYSICAL COVERS, SPRAY FOAMS, OR OPERATIONAL MEASURES.

7. THE HOURS OF OPERATION WILL COMPLY WITH LOCAL CONSTRUCTION CODE REQUIREMENTS OR ACCORDING TO SPECIFIC VARIANCES ISSUED FOR THIS PROJECT. THE PROJECT WILL ALSO COMPLY WITH APPLICABLE LOCAL NOISE CONTROL STANDARDS.

8. ALL WORK WILL ALSO BE PERFORMED IN ACCORDANCE WITH THE NYSDEC APPROVED REMEDIAL ACTION WORK PLAN (RAWP).

RAPID IMPACT COMPACTION

1. RAPID IMPACT COMPACTION (RIC) IS A GROUND IMPROVEMENT METHOD USED TO DENSIFY THE EXISTING FILL AND DEBRIS IN-PLACE.

2. RIC USES A 7.5-TON WEIGHT DROPPING FROM A CONTROLLED HEIGHT ONTO A PATENTED FOOT. ENERGY IS TRANSFERRED TO THE GROUND SAFELY AND EFFICIENTLY AS THE RIC FOOT REMAINS IN CONTACT WITH THE GROUND. THE COMPACTION POINTS ARE LAID OUT IN A GRID PATTERN AND MULTIPLE BLOWS ARE APPLIED AT EACH POINT. MULTIPLE PASSES WILL ALSO BE REQUIRED TO ASSURE UNIFORM DENSIFICATION OF THE SOIL LAYERS.

3. THE RIC METHOD IS TYPICALLY CAPABLE OF COMPACTING FILL UP TO 20 FEET IN DEPTH SO THE FULL DEPTH OF THE FILL AND DEBRIS ON THE SITE WILL NOT BE DENSIFIED BY THE RIC OPERATION.

4. THE RIC WILL RESULT IN CRATERS ON THE SITE. THEREFORE, IMPORTED FILL MATERIAL WILL BE REQUIRED TO LEVEL THE SITE AND TO RAISE GRADES TO THE PLANNED SUBGRADE ELEVATIONS. NEW FILL REQUIRED TO ACHIEVE THE PLANNED SUBGRADE ELEVATIONS SHALL CONSIST OF DENSE GRADED AGGREGATE (DGA) AND SHALL BE PLACED AS COMPACTED FILL AFTER THE RIC HAS BEEN COMPLETED.

5. BECAUSE RIC PROVIDES A LOW MAGNITUDE OF IMPACT LOADING AT A VERY HIGH FREQUENCY, THE PEAK PARTICLE VELOCITY (PPV) REMAINS RELATIVELY LOW (LESS THAN 2 INCHES PER SECOND) AT A DISTANCE OF 30 FEET FROM THE DROP POINT. THIS MEANS THAT DENSIFICATION CAN BE PERFORMED CLOSER TO PROPERTY LINES, ADJACENT STRUCTURES, AND/OR EXISTING UTILITIES THAN OTHER METHODS, SUCH AS DEEP DYNAMIC COMPACTION.

6. BASED ON OUR EXPERIENCE AND THE SITE CONDITIONS, WE EXPECT THAT THE RIC PROGRAM CAN BE DESIGNED IN A MANNER THAT WILL NOT DETRIMENTALLY AFFECT THE NEARBY STRUCTURES. HOWEVER, VIBRATIONS MAY BE FELT IN THE AREA SURROUNDING THE SITE. BECAUSE OF THE GROUND VIBRATIONS GENERATED DURING RIC, THE PROCESS MUST BE CLOSELY MONITORED BY A SEISMOLOGIST USING A SEISMOGRAPH TO ENSURE THAT THE RECOMMENDED PEAK PARTICLE VELOCITIES ARE NOT EXCEEDED AND NEARBY STRUCTURES ARE NOT ADVERSELY AFFECTED.

7. RIC MUST BE CONDUCTED PRIOR TO THE INSTALLATION OF NEW UTILITIES ON THE SITE. THIS IS NECESSARY TO PREVENT DAMAGE TO THESE UTILITIES AS A RESULT OF GROUND VIBRATIONS ASSOCIATED WITH THE RIC PROCESS.

8. PRIOR TO ANY RIC WORK BEING DONE, A LICENSED PROFESSIONAL ENGINEER WILL BE RETAINED TO PERFORM A DETAILED PRE-CONSTRUCTION SURVEY OF THE EXISTING STRUCTURES LOCATED WITHIN 250 FEET OF THE WORK AREA.

9. THE RIC PROGRAM SHALL BE DESIGNED BY THE CONTRACTOR. SHOP DRAWINGS AND A WORK PLAN SHALL BE PREPARED BY THE RIC CONTRACTOR AND SUBMITTED TO CARLIN-SIMPSON & ASSOCIATES FOR REVIEW.

UTILITY OR WALL SUBGRADE PREPARATION

1. UTILITY PIPES, UTILITY STRUCTURES, AND RETAINING WALLS THAT ARE UNDERLAIN BY FILL MATERIAL WITH DEBRIS WILL LIKELY SETTLE. THE AMOUNT OF SETTLEMENT WILL VARY AND IS UNPREDICTABLE GIVEN THE UNPREDICTABLE NATURE OF THE EXISTING FILL MATERIAL ON THE SITE. THE SETTLEMENT CAN ADVERSELY AFFECT THE SERVICEABILITY OF THE UTILITIES AND RESULT IN DAMAGE TO THE WALLS.

2. TO REDUCE THE AMOUNT OF POST-CONSTRUCTION SETTLEMENT, THE NEW UTILITIES AND RETAINING WALL AREAS SHALL BE OVER-EXCAVATED APPROXIMATELY TWO (2) FEET VERTICALLY BELOW THE PLANNED SUBGRADE ELEVATION AND TWO (2) FEET HORIZONTALLY BEYOND EITHER SIDE OF THE UTILITY OR THE WALL FOUNDATION. THE EXPOSED SUBGRADE AT THE BOTTOM OF THE EXCAVATION SHALL BE CLEANED OF ALL LOOSE MATERIAL AND COMPACTED UNDER THE FULL-TIME INSPECTION OF THE GEOTECHNICAL ENGINEER.

3. ONCE THE SUBGRADE HAS BEEN APPROVED BY THE GEOTECHNICAL ENGINEER, A LAYER OF TRI-AXIAL GEOGRID REINFORCEMENT (TENSAR TX-140 OR EQUIVALENT) SHALL BE PLACED ON THE APPROVED SUBGRADE AND 12 INCHES OF DENSE GRADED AGGREGATE (DGA) SHALL BE INSTALLED IN THE EXCAVATION. A SECOND LAYER OF GEOGRID REINFORCEMENT SHALL THEN BE INSTALLED ALONG WITH A SECOND LAYER OF DGA.

4. THE DGA SHALL BE INSTALLED IN MAXIMUM 12 INCH LAYERS AND EACH LAYER SHALL BE COMPACTED TO AT LEAST 95% OF ITS MAXIMUM MODIFIED DRY DENSITY (ASTM D-1557). EACH LAYER SHALL BE COMPACTED, TESTED, AND APPROVED PRIOR TO PLACING SUBSEQUENT LAYERS. ONCE THE GEOGRID AND DGA HAVE BEEN INSTALLED TO THE REQUIRED SUBGRADE ELEVATION, THE DENSIFIED SITE SOILS AND DGA MAY BE USED TO SUPPORT THE NEW UTILITIES AND RETAINING WALLS.

5. AFTER THE UTILITY IS INSTALLED, THE TRENCH SHALL BE BACKFILLED WITH CONTROLLED COMPACTED FILL.

6. A TYPICAL DETAIL FOR UTILITY SUBGRADE PREPARATION IS INCLUDED ON THIS SHEET (DETAIL 1).

ENTRANCE AREA SUBGRADE PREPARATION

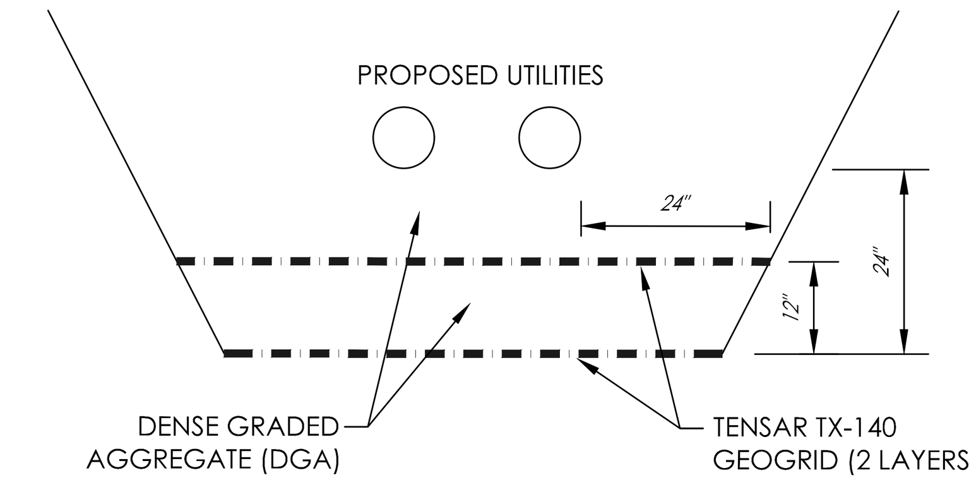
1. THE MAIN ENTRANCE AREA TO THE PROPOSED BUILDING IS A CRITICAL AREA THAT IS UNDERLAIN BY FILL MATERIAL WITH DEBRIS AND WILL LIKELY SETTLE. THE AMOUNT OF SETTLEMENT WILL VARY AND IS UNPREDICTABLE GIVEN THE UNPREDICTABLE NATURE OF THE EXISTING FILL MATERIAL ON THE SITE. THE SETTLEMENT CAN RESULT IN DAMAGE TO THE SIDEWALKS, RAMPS, STEPS, CURBS, AND PAVEMENT IN THIS AREA.

2. TO REDUCE THE AMOUNT OF POST-CONSTRUCTION SETTLEMENT, THE AREA SHALL BE OVER-EXCAVATED APPROXIMATELY TWO (2) FEET VERTICALLY BELOW THE PLANNED SUBGRADE ELEVATION PRIOR TO PERFORMING RAPID IMPACT COMPACTION (RIC).

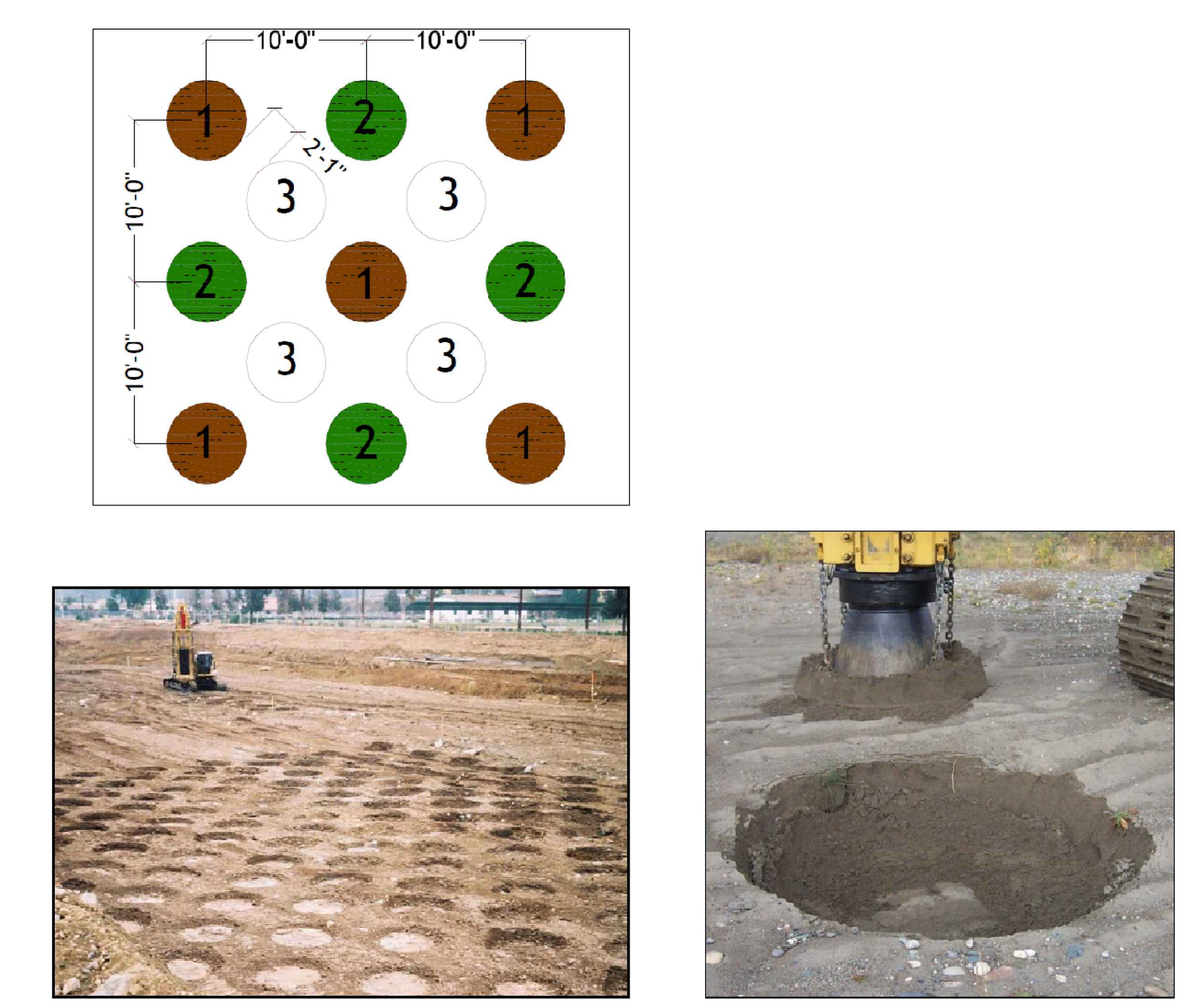
3. ONCE RIC IS COMPLETE, THE RESULTING CRATERS SHALL BE FILLED WITH DENSE GRADED AGGREGATE (DGA) IN MAXIMUM 12 INCH LIFTS. THE EXPOSED SUBGRADE SHALL THEN BE COMPACTED UNDER THE FULL-TIME INSPECTION OF THE GEOTECHNICAL ENGINEER.

4. ONCE THE SUBGRADE HAS BEEN APPROVED BY THE GEOTECHNICAL ENGINEER, A LAYER OF TRI-AXIAL GEOGRID REINFORCEMENT (TENSAR TX-140 OR EQUIVALENT) SHALL BE PLACED ON THE APPROVED SUBGRADE OVER THE ENTIRE AREA.

5. TO ACHIEVE THE PLANNED SUBGRADE ELEVATION, DGA SHALL BE INSTALLED IN MAXIMUM 12 INCH LAYERS AND EACH LAYER SHALL BE COMPACTED TO AT LEAST 95% OF ITS MAXIMUM MODIFIED DRY DENSITY (ASTM D-1557). EACH LAYER SHALL BE COMPACTED, TESTED, AND APPROVED PRIOR TO PLACING SUBSEQUENT LAYERS. ONCE THE GEOGRID AND DGA HAVE BEEN INSTALLED TO THE REQUIRED SUBGRADE ELEVATION, THE DENSIFIED SITE SOILS AND DGA MAY BE USED TO SUPPORT THE NEW SIDEWALKS, RAMPS, STEPS, CURBS, AND PAVEMENT IN THE MAIN ENTRANCE AREA.



(1) TYPICAL UTILITY SUBGRADE PREPARATION
NO SCALE



(2) RAPID IMPACT COMPACTION LAYOUT & CRATERS (TYP.)
NO SCALE

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REVISION	DATE	DESCRIPTION
1	11.30.16	RAPID IMPACT COMPACTION ADDED

SEAL:

ROBERT B. SIMPSON, P.E.
PROFESSIONAL ENGINEER

GROUND IMPROVEMENT PLAN

MARRIOTT SPRINGHILL SUITES
109-125 MARBLEDALE ROAD
TUCKAHOE, NEW YORK

DRAWN	SCALE
MRA	1" = 30'
CHECKED	DATE
RBS	11.10.16
PROJECT NO.	DWG NO.
14-100	GT-1
APPROVED	

CARLIN-SIMPSON AND ASSOCIATES
61 Main Street
Sayreville, NJ 08872

Consulting Geotechnical and Environmental Engineers

Table 1

109 Marbledale Road
Tuckahoe, New York
NYSDEC BCP Site No. C360143

Well Vapor Readings - Pile Test

4/3/17 - Well Readings								
	MW-4		MW-1		MW-6		SVE-1	
Time	*PID (ppm)*	*FID (ppm)*	*PID (ppm)*	*FID (ppm)*	*PID (ppm)*	*FID (ppm)*	*PID (ppm)*	*FID (ppm)*
10:00	1.0	>500	5.1	>500	0.3	>500	15.8	>500
11:47	1.0	>500	3.4	>500	0.3	>500	16.9	>500
13:25	1.3	>500	2.5	>500	0.3	>500	14.2	>500
15:10	1.3	>500	2.3	>500	0.4	>500	14.7	>500

High ceiling alarm exceeded when FID > 500. Needed to be re-calibrated to set the limit higher.

4/4/17 - Well Readings						
	MW-4		MW-6		SVE-1	
Time	*PID (ppm)*	*FID (ppm)*	*PID (ppm)*	*FID (ppm)*	*PID (ppm)*	*FID (ppm)*
12:00	0.7	"hose clogged"	0.5	"hose clogged"	18.3	"hose clogged"
13:55	1.0	"hose clogged"	0.5	"hose clogged"	20.6	"hose clogged"
14:35	1.2	"hose clogged"	0.9	"hose clogged"	19.4	"hose clogged"
15:35	1.2	"hose clogged"	0.7	"hose clogged"	16.7	"hose clogged"

4/5/17 - Well Readings						
	MW-4		MW-6		SVE-1	
Time	*PID (ppm)*	*FID (ppm)*	*PID (ppm)*	*FID*	*PID (ppm)*	*FID (ppm)*
12:00	1.4	564	0.6	1.30%	22.5	612
13:15	1.8	2387	0.7	2.58%	23.3	4118
14:25	0.7	2280	0.5	2.80%	23.8	1192
15:10	1.5	1051	0.1	48 ppm	24.2	7320
16:20	1.2	1200	0	72 ppm	23.6	742

4/6/17 - Well Readings								
	MW-4		MW-5		MW-6		SVE-1	
Time	*PID (ppm)*	*FID (ppm)*	*PID (ppm)*	*FID*	*PID (ppm)*	*FID (ppm)*	*PID (ppm)*	*FID (ppm)*
10:30	0.7	7000	0.7	2.5%	0.3	96	24.3	1200
11:30	0.9	6000	0.8	5.0%	0.5	75	18.0	1500

4/7/17 - Well Readings								
	MW-4		MW-5		MW-6		SVE-1	
Time	*PID (ppm)*	*FID (ppm)*	*PID (ppm)*	*FID (ppm)*	*PID (ppm)*	*FID*	*PID (ppm)*	*FID (ppm)*
9:40	0.4	3400	1.9	420	0.9	3.0%	15.4	16

Note: Micropile Installation work started at approx noon on 04-04-17

Table 1

109 Marbledale Road
Tuckahoe, New York
NYSDEC BCP Site No. C360143

Well Vapor Readings - Pile Test

4/10/17 - Well Readings						
	MW-4		MW-5		SVE-1	
Time	*PID (ppm)*	*FID*	*PID (ppm)*	*FID (ppm)*	*PID (ppm)*	*FID (ppm)*
9:05	0.3	1740 ppm	0.9	1578	12.9	3
10:31	0.4	1864 ppm	1.1	1080	14.8	7
11:31	0.2	2850 ppm	1.0	4500	15.0	3
13:39	0.5	3689 ppm	1.1	1.3%	15.2	3
15:05	0.0	1.2%	0.9	6	13.6	5

4/11/17 - Well Readings						
	MW-4		MW-5		SVE-1	
Time	*PID (ppm)*	*FID (ppm)*	*PID (ppm)*	*FID*	*PID (ppm)*	*FID (ppm)*
8:00	0.4	3900	0.9	1.7%	9.1	82.0
9:20	0.7	1523	0.8	8797 ppm	11.5	157.0
10:20	0.9	1160	0.8	5004 ppm	8.8	50.3
11:20	1.0	333	0.6	1487 ppm	7.4	76.6
13:10	1.4	35	0.8	2900 ppm	9.2	75.8
14:30	1.4	3	1.0	1225 ppm	8.9	87.2

4/12/17 - Well Readings								
	MW-4		MW-5		SVE-1		MW-6	
Time	*PID (ppm)*	*FID*	*PID (ppm)*	*FID (ppm)*	*PID (ppm)*	*FID (ppm)*	*PID (ppm)*	*FID (ppm)*
12:30	0.9	8500 ppm	2.2	1500	13.6	2	-	-
15:00	1.0	1.5%	0.8	650	-	-	7.7	10

4/13/17 - Well Readings						
	MW-4		MW-6		SVE-1	
Time	*PID (ppm)*	*FID*	*PID (ppm)*	*FID (ppm)*	*PID (ppm)*	*FID (ppm)*
8:15	0.4	3477 ppm	0.7	2517	10.5	3
9:35	0.4	1519 ppm	0.3	181	12.4	15
11:30	0.7	1270 ppm	0.4	975	12.9	45
13:15	0.3	2.2%	0.4	894	12.9	14
15:05	0.4	1.1%	0.3	389	15.3	10

4/14/17 - Well Readings								
	MW-4		MW-1		MW-6		SVE-1	
Time	*PID (ppm)*	*FID*	*PID (ppm)*	*FID (ppm)*	*PID (ppm)*	*FID (ppm)*	*PID (ppm)*	*FID (ppm)*
8:30	0.9	887 ppm	2.2	1168	1.1	8500	2.0	2
11:00	1.0	6178 ppm	2.1	5562	1.0	2226	15.8	16
13:10	2.7	1.4%	3.1	5719	1.3	7315	86.8	87