

*Prepared For*

Nursery Products, LLC.  
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**FINAL CONSTRUCTION  
QUALITY ASSURANCE REPORT  
WASTE PILE COMPOSTING PAD and  
SURFACE IMPOUNDMENT A and B**

**HAWES COMPOSTING FACILITY**



*Prepared by*

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## ***SECTION 1.0 INTRODUCTION***

### **1.1 General Information**

This Construction Quality Assurance and (CQA) Final Construction Report has been prepared for the Nursery Products Hawes Composting Facility (HCF) located in San Bernardino County, California (Site). This CQA/CQC Final Construction Report has been prepared in accordance with and meets the requirements as outlined in the approved Nursery Products Final Design, Construction Quality Assurance Plan & Technical Specifications as prepared by Geosyntec Consultants, dated May 2011, and to support the Report of Waste Discharge (ROWD) for the HCF.

This CQA/CQC Final Construction report has been prepared by the CQA consultant for HCF, Zero Energy Institute, LLC (ZEI) which is an independent party not affiliated with the contractors, geosynthetics installer-manufacturer or HCF. ZEI had the overall responsibility for managing, coordinating, and implementing the CQA activities and confirming that the contractor's construction quality control activities were performed in strict compliance with the approved plans and specifications and industry standard of care. Critical construction activities related to geosynthetic manufacturing, geosynthetics installations, earthwork removals, earthworks placement (cut and fills), earthworks CQC material conformance testing, and civil improvements were monitored and documented by ZEI. Construction activities documented in this report cover construction of HCF.

Key HCF project team members included:

- **HCF Owner:** Nursery Products, owners' representative Chris Seney, Construction Manager (CM) and site Resident Engineer (RE) for HCF.
- **General Contractor:** Quantum Contractors, responsible for general construction including earthworks, grading, lines and grades, piping, and mechanical as delineated in the design drawings and technical specifications.
- **Geosynthetic General Contractor:** EC Applications, Inc. (ECA), was contracted directly by the owner to provide geosynthetic installation. They were responsible for the geosynthetic supply (60-mil HDPE and GCL) and installation including monitoring systems i.e. lysimeters, and leak detection sumps, material handling, storage, placement, seaming, anchoring against wind up-lift, CQC testing and evaluation.
- **Geosynthetic Manufacturers:** Agru America manufactured and supplied the 60-mil High Density Polyethylene (HDPE) liner. CETCO Lining Technologies manufactured and supplied the Geosynthetic Clay Liner (GCL) Bentomat ST. Skaps Industries manufactured and supplied the 8.0 oz Geotextile Fabric. All manufacturers provided materials that met or exceeded the project requirements.
- **Geomembrane Testing Laboratory:** Precision Geosynthetics Laboratory (PGL), responsible for the independent testing for the HDPE destructive seam testing. PGL provided peel and shear testing, density and thickness evaluations.
- **Soils Testing and Soils Laboratory CQA:** Sladden Engineering, responsible for independent laboratory and field moisture density material compliance. Sladden

conducted tests on representative soils samples to evaluate their properties and verify compliance with the design drawings and technical specifications.

- **Third Party, Independent CQA Consultant:** CQA monitoring was performed by ZEI. ZEI is the CQA Consultant for HCF, and had the overall responsibility of managing, coordinating, and implementing the CQA activities and confirming that the contractor's construction quality control activities were performed in accordance with the approved CQA Plan. ZEI's Project Manager Mr. Shannon Goodrich and certifying professional engineer Mr. Doug Hilts had the overall responsibility for Quality Assurance. All CQA and CQC documentation has been reviewed, evaluated, and approved by ZEI and are represented in this report.

## 1.2 Purpose

The purpose of this construction report is to provide quality assurance documentation showing that: (i) work has been performed in accordance with the construction documents; (ii) physical conformance sampling and field testing was completed successfully as outlined in the CQA Plan; (iii) verify that the required CQC and CQA documentation is complete and accurate, as outlined in the Construction Quality Assurance Plan & Technical Specifications.

## ***SECTION 2.0 HCF CONSTRUCTION OVERVIEW***

### 2.1 Facility Construction:

The HCF is a biosolids and green material composting facility located on 80-acres of a 160-acre parcel located within an unincorporated area of San Bernardino County. The facility will compost biosolids and green materials to produce agricultural grade compost in compliance with U.S. Environmental Protection Agency (EPA) Code of Federal Regulations (CFR), and the California Code of Regulations, Title 14 (14 CCR). The composting process was originally designed to occur in windrows on approximately 72-acres on a compost pad ("waste pile"). During construction the decision was made to build a 60-acre Waste Pile rather than a 72-acre Waste Pile and not complete the southerly 12-acres of the Waste Pile at this time. Stormwater controls and the perimeter berm were constructed in accordance with the Design Plan however; a minor deviation for embitterment was implemented. The entire storm water collection channel was lined with a 3-foot thick, ¼ ton rip-rap for erosion protection. There is a one-foot perimeter berm along the south, west and east sides of the Waste Pile. The only alteration is the location of the southerly perimeter berm due to the decision not to construct the southerly 12-acres. 8-acres of the 80-acre project contain the two surface impoundments and stormwater controls (See Appendix E). The waste pile is a prepared engineered fill pad that consists of native soil prepared and compacted to a firm and unyielding condition. The engineered waste pile is graded to slope towards the two (2) geosynthetic lined surface impoundments A (East) and B (West) located on the northerly portion of the HFC. The construction included storm water control berms around the perimeter of the facility to control site run-off and off site run-on. In addition, the waste piles are separated by a common diversion berm constructed as an engineered fill. A berm was also constructed to separate the waste pile from the surface impoundments. Each surface impoundment is equipped with underliner leak detection sumps and Vadose monitoring lysimeters located beneath the lined impoundment systems.

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This report covers construction and CQA work performed on the Waste Pile Composting area, Surface Impoundment A, and Surface Impoundment B. The ZEI CQA program was performed on the following construction materials, workmanship and installation practices:

*2.1.1 Earthworks for the Waste Pile:* Visual monitoring and CQA laboratory and field testing were performed on the waste pile soil liner foundation which consisted of a minimum of 12-inches of engineered fill composed of native subgrade that has been processed, scarified, moisture conditioned and compacted to minimum 90 percent relative compaction as defined by American Society for Testing and Materials (ASTM D 1557). Monitoring of the waste pile perimeter berm was also performed during construction. The earthen berm was constructed of an engineered fill consisting of on-site soil compacted to minimum 90 percent relative compaction using ASTM D 1557 as the standard.

The project geotechnical engineer, Sladden Engineering, conducted soil conformance testing on the constructed Waste Pile earthworks to ensure compliance with the Technical Specifications. The Waste Pile Composting Area was constructed in accordance with the County of San Bernardino grading permit and the approved design plan and specifications.

The waste pile soil liner consists of a minimum 12-inch of engineered select fill that consist of native subgrade material scarified and moisture conditioned and compacted to minimum 90 percent relative compaction as defined by ASTM D1557. The waste pile was first cleared of all native organics and bladed uniformly. This was followed by scarification of the in-place soils to a depth of 12 to 14-inches. Water was added as needed to control the moisture content of the processed soil. Compaction of the soil was achieved using a vibratory roller and heavy equipment until the fill was firm and unyielding. Moisture/Density testing was performed on the processed pad and fill at a frequency of one (1) test per 1,000 cubic yards of material processed, placed and compacted. Sladden Engineering provided the field sketch showing quality control test locations and supporting compaction results.

The grading contractor has now completed construction of the 60-acre Waste Pile as shown on the Post Grading Survey, (See **Appendix E**, Waste Pile and Surface Impoundments Post Grading As-Built Survey). With the exception of the 12 acres on the south end as described above in Section 2.1, the Waste Pile was constructed in accordance with the Design Plan and Technical Specifications. **Appendix A** –Waste Pile Composting Area. Appendix includes Sladden Engineering CQA Earthworks testing for the completed Waste Pile (See Appendix A, Sladden Engineering CQA Earthworks Testing for Waste Pile Composting Area & Surface Impoundments A and B).

*2.1.2 Surface Impoundments (Ponds A and B) liner soil foundation:* Visual monitoring and CQA testing were performed on the two (2) surface impoundments Pond A

and Pond B. The two surface impoundments were constructed to contain storm water from a 1,000-year, 24-hour storm event over the entire facility drainage area. Surface Impoundment A (approximately 10.5 acre feet) is located in the northwest corner of the facility and Surface Impoundment B (approximately 6.5 acre feet) is located in the northeast portion of the facility. The two surface impoundments were constructed in accordance with the approved Regional Water Quality Control Board (RWQCB) drawings and construction was designated as a single composite liner system. The constructed liner system includes (from bottom to top, in order of construction):

- Six (6) inches of prepared compacted native subgrade moisture conditioned and compacted to a minimum 90 percent of the maximum dry density per ASTM D 1557;
- Leak detection monitoring sumps under the lowest part of each surface impoundment that consists of a composite liner of a geosynthetic clay liner (GCL), a smooth 60-mil high density polyethylene (HDPE) flexible membrane liner, and a cushion geotextile fabric that surrounds and envelopes a gravel drainage layer;
- A GCL liner on the pond floor and side slopes anchored in an earthen filled anchor trench at the perimeter top of slope; and
- A 60-mil HDPE liner on the pond floor and side slopes anchored in an earthen filled anchor trench at the perimeter top of slope.

The geosynthetic 60-mil HDPE is the primary liner for the surface impoundments. To provide additional protection to downward migration of water and a smooth surface on which the HDPE was placed, a GCL was included in the liner section beneath the HDPE liner. The GCL consists of powdered bentonite clay sewn in between two layers of geotextile fabric. The surface impoundment liner systems are ballast on the bottom of the impoundment floor and anchored down to avoid up-lift by wind.

**2.1.3 Facility Perimeter Berm:** A variable height berm of a minimum of one-foot with slopes of 2:1 (horizontal to vertical) was constructed around the perimeter of the HCF to control storm water run-off, to and from the facility, respectively. The berms consist of an engineered fill made up of processed and compacted native soil. The perimeter berm was built in accordance with the Design Plan with the only alteration being the location of the southerly perimeter berm due to the decision not to construct the southerly 12-acres.

**2.1.4 Surface Impoundment Diversion Berm:** The surface impoundment diversion berms were constructed to allow storm water to flow through three defined diversion openings to control and divert flow. The surface impoundment diversion berm is located upstream of the surface impoundments, as shown on the design drawings.

**2.1.5 Leak Detection Monitoring Sumps:** The HCF construction included a leak detection monitoring sump (LDMS) below the lowest portion of each surface impoundment. The LDMS allows for detection of the potential vertical migration of water and removal of a water sample for testing. The LDMS consist of, from bottom to top, a GCL, a HDPE geomembrane, cushion geotextile, 2-feet of clean gravel, and a non-woven filter fabric. A 6-inch diameter PVC pipe was installed within the gravel zone to allow access for moisture detecting equipment and to allow for sampling and/or pumping of liquids from the LDMS.

The Surface Impoundment Leak Detection Monitoring Sumps (LDMS) are constructed below the lowest portion of each surface impoundment at or around an elevation of 2,305 and located directly above the bottom Lysimeter (separated by 5-feet vertical). The LDMS are built per detail M, sheet 8 of 9 and Section view H, sheet 7 of 9 of the Design Plan drawings. The LDMS allows for detection of the potential vertical migration of water through the primary HDPE liner system and removal of a water sample for testing. The LDMS is composed of, from top to bottom, a prepared subgrade, a GCL, a FML, cushion Geotextile fabric, 2-feet of clean gravel, and a nonwoven filter Geotextile wrap. A 6-inch diameter PVC pipe is installed within the gravel layer to allow access for moisture detecting device and to allow for sampling and/or pumping of liquids from the LDMS.

The constructed LDMS was built in accordance with the approved Technical Specifications and approved construction drawings as illustrated in Section H, Section J, Section I, and Details L and M respectfully.

**2.1.6 Lysimeter Monitoring Zone:** The liner system construction included a lysimeter built five feet below the lowest portion of each surface impoundment. The lysimeter was constructed to detect potential vertical migration of water and removal of water samples for testing. The lysimeter is composed of, from bottom to top, a GCL, geomembrane, cushion geotextile, 2-feet of clean gravel, and a nonwoven filter fabric. A 6-inch diameter PVC pipe with perforated ends was installed within the gravel zone to allow access. The lysimeter was constructed to detect potential leakage from the above lined system.

The Leak Detection Monitoring Sumps (LDMS) and Lysimeters were constructed in accordance with the approved drawings, detail M (detail leak detection sump plan view), and detail N (detail lysimeter plan view) of the approved construction drawings, revision 2, sheet 8 of 9. In section view, the Leak Detection Monitoring Sump and Lysimeter were constructed in accordance with Section H, Leak Detection Monitoring Sump and Lysimeter. The in-place liner system includes a Lysimeter (22'-0" feet long by 22'-0" feet wide) constructed five (5) feet below the lowest portion of each surface impoundment, at or around an elevation of 2,300. The Lysimeters are located directly below the LDMS and

separated by a five (5'-0") foot vertical select soil fill. The Lysimeters consist of, from top to bottom including the trench line, a GCL, geomembrane, cushion geotextile fabric, 2-feet of clean washed gravel, and enveloped in a nonwoven geotextile wrap. A 6-inch diameter PVC pipe is installed within the gravel layer to allow access for liquid monitoring and or removal. The bottom 2-feet of the PVC monitoring pipe are perforated per plan.

*2.1.7 Manufacturers Quality Assurance (MQA) Materials Review and Acceptance:* As required by project technical specifications, the geosynthetic material was not to be placed until a complete third party review was performed on the ECA geosynthetic submittal packages. ZEI was responsible for reviewing all MQA submittal packages and determining if the materials manufactured and delivered to the site met or exceeded the project Technical Specifications and CQA Plan. The QA review was performed by ZEI CQA Representative. The MQA test data was received for each roll of smooth HDPE, GCL and geotextile delivered by ECA, and then reviewed by the CQA Representative for material requirement compliance. All geosynthetic material QA data was reviewed and subsequently approved for its use in construction. No material delivered was determined to be out of compliance, in final assessment. The liner materials were placed on an approved roll list cataloging only approved rolls for use in construction. The Contractor was provided a copy of the approved roll list and required to deploy material from that list only. The CQA Representative inspected each roll of material before placement for QA audit. All geosynthetic material was off-loaded, handled and stored in accordance with the manufacturer's recommendations [See **Appendix B** Geosynthetic Manufacturer's Quality Assurance (MQA)].

*2.1.8 CQA Monitoring, Testing and Documentation:* One (1) full time CQA Representative was on-site at all times during the liner construction for the HCF site. For this project, ZEI's Mr. James Hansen, and as-needed Mr. Brett Jordan, were the lead CQA/CQC Representatives. Mr. Hansen and Mr. Jordan managed the day to day Hawes Composting Facility CQA program for all geosynthetic activities. These activities included submittal review, manufacturer's roll certification review, inventory, material sampling, installation monitoring, inspection and testing. They also supervised all installation methods and practices and provided documentation as outlined in this report.

Before liner deployment, all subgrade surfaces were inspected by ZEI, ECA and Nursery Products. Subgrade conditions were documented and approved by all parties before the liner was deployed. Subgrade certification reports were prepared for the approved surfaces.

GCL and HDPE panel placement was controlled with a unique panel number on each panel (sheet) placed. Panels were visually inspected for imperfections or damage. Imperfections or damaged areas observed were located and documented

on a defect log sheet. They were then repaired and nondestructively tested until a passing result was witnessed and documented.

Prior to production panel welding and each welding shift (four to five hours), trial welds were documented by ZEI. Trial welds were performed under identical production seaming conditions. Operators and machines passing trial seams were permitted to perform production welding. The operator was identified by his initials and machine number. Potential seaming problems were observed and corrected through the trial welding process before actual welding began. Elements of the successful trial did not change during production welding.

Production welding was controlled by closely monitoring the material condition, wedge machine's (equipment) speed, operation temperature, and noting of proper overlap. For each technician, cumulative seam length totals were recorded to control destructive sample frequencies on ZEI's Seam Control Log. All seam imperfections were recorded, repaired, and non-destructively tested until a passing result was witnessed by ZEI's CQA Representative.

Imperfections and defects were assigned a unique control number. Defects were located on field forms by measuring to the nearest stationary mark. All defects were repaired and nondestructively tested until a passing result was witnessed by ZEI's CQA Representative.

The entire HDPE liner seams were 100 percent non-destructively tested. Fusion weld (wedge machine) seams were non-destructively tested by performing the air pressure test. Air was introduced into the hollow seam chamber until approximately 27-30 psi was achieved. The tests were monitored for five minutes and a passing result was recorded if the pressure remained in the channel. A loss of only two (2) psi was permitted for seams. Extrusion welds were tested using a vacuum box chamber with a soap/water solution.

Destructive sampling and testing were prepared as described in the Technical Specifications. The destructive sample was clearly marked on each seam specimen. A unique destructive number was assigned to each sample for QA control. The samples were approximately 42 inches long by 12 inches wide, with seam centered. The liner installer and CQA Representative had samples cut out of their portion and field-tested for seam strength. The remaining portion was delivered to the independent CQA laboratory for testing in accordance with project specifications.

A detailed field as-built drawing was performed for the GCL and HDPE liner of each surface impoundment. Panel locations, panel identification, seam numbers, sumps, and pipe extensions were recorded on this drawing. Destructive test locations and defect repairs were also recorded on this drawing (See **Appendix C** EC Applications CQC Documentation Surface Impoundment A and B).

The liner installer, ECA provided “As-Built” drawings for the surface impoundments A and B. The drawings include a computer generated drawing so that both impoundments A and B match in format. The drawings also include a Section of the LDMS and Lysimeter showing the vertical separation between the structures. The revised drawings are a substitute for the “hand-drawing” and is included in ZEI’s **Appendix C**, EC Applications CQC Documentation Surface Impoundments A and B.

- 2.1.9** *Upstream Stormwater Controls:* A drainage channel at the southern end of the facility designed to capture offsite stormwater run-on and redirect offsite flows around the HCF was constructed according to the Design Plan.

### ***SECTION 3.0 CONSTRUCTION QUALITY ASSURANCE PROGRAM***

Nursery Products owns and operates the composting facility located in San Bernardino County, California. Quantum Contractors was the General Contractor responsible for all earthworks construction, piping and construction of the diversion berms. Quantum also assisted ECA as needed with the surface impoundment liner ballast system in the pond floor and perimeter earthen filled anchor trenches construction. Quantum used one (1) Caterpillar G14 Grader equipped with laser guidance GPS for grade control and rear ripper shanks approximately 14-inches in length to rip and scarify the native soil material. Quantum typically used two (2) Caterpillar 623 Earth Moving Scrappers to excavate and haul fill material to the waste pile fill locations. Two (2) water trucks continuously moisture conditioned the engineered fill soil to control dust. One (1) Caterpillar D4 Bull Dozer and a Case 420 Backhoe were used for lighter earthworks. For compaction, Quantum typically used a large smooth drum roller with a vibrator for soil consolidation.

#### **3.1 Earthworks for the Waste Pile:**

Visual monitoring and CQA laboratory and field testing were performed on the waste pile compacted soil. The compacted soil consisted of a minimum of 12-inches of engineered fill composed of native subgrade that has been processed, scarified, moisture conditioned and compacted to minimum 90 percent relative compaction as defined by American Society for Testing and Materials (ASTM D 1557). Representative bulk soil samples were obtained prior to earthworks and tested for physical properties and reviewed for compliance. All soil material within the project excavation limits was tested and determined to be suitable for the engineered fill construction. Conformance was determined by laboratory and field monitoring and QA testing. The contractor was required to clear and grub and strip away all vegetation within the waste pile limits. Quantum scarified all waste pile fills by ripping the native soil down to 12 inches and adding water to moisture condition the soil for compaction. Prior to additional fill lift placement, the entire area was scarified to assist in bonding between soil lifts. Fill placement and moisture conditioning was monitored closely to verify conformance with the CQA Plan. Construction of the waste pile perimeter berm around the facility was also monitored for compliance. The earthen berm consisted of an engineered fill consisting of on-site soil compacted to minimum 90 percent relative compaction using ASTM D 1557 as the standard.

### **3.2 Surface Impoundments (Ponds A and B) Liner Soil Foundation and Sumps:**

Visual monitoring and CQA testing was performed on the two (2) surface impoundments Pond A and Pond B. The two surface impoundments are identical with respect to material and liner section design and construction. Surface Impoundment A (approximately 10.5 acre feet) located in the northwest corner of the facility was constructed first and Surface Impoundment B (approximately 6.5 acre feet) located in the northeast portion of the facility was constructed last. The two surface impoundments were constructed in accordance with the approved drawings and construction is designated as a single composite liner system. The constructed liner system includes (from bottom to top, in order of construction) Vadose Zone Lysimeters and Leak Detection Sumps:

1. Compacted native subgrade, smooth and unyielding;
2. GCL;
3. 60-mil (smooth) HDPE Liner;
4. Geotextile cushions fabric;
5. Detection Sump, Equipped with a Sump Leak Detection PVC Pipe; and
6. Drainage rock, with Geotextile, 8.0 oz. fully wrapped.

The leak detection and monitoring system included the construction of Vadose Monitoring Lysimeters and Leak Detection Monitoring Sumps. These monitoring detection systems were constructed in accordance with the Geosyntec Consultant design, per detail M and N, Sheet 8.

### **3.3 Surface Impoundment A and B Earthworks and Liner System:**

The earthworks for both surface impoundments were constructed using the same means and methods as the waste pile cut and fill. The impoundments were excavated to the design lines and grades. At times, in isolated areas, Quantum encountered a thin sand layer within the surface impoundment limits. This fine sand was removed by over excavation. The excavated area was then backfilled with select engineered fill in thin control lift thicknesses. Each new lift of engineered fill was scarified, moisture conditioned, and compacted in approximately 8-inch loose lifts. Heavy equipment provided the compaction means and the final compaction was performed using a vibratory roller. Grade control was provided by Quantum Contractors. Using GPS equipment the contractor performed rough grading. The subgrade and side slope were processed by mechanical scarifying and ripping of the native material down to a minimum 8-inches until fully loosened. The native soil was moisture conditioned to approximate optimum moisture content and compacted to a minimum 90 percent relative compaction as defined by ASTM D 1557. The ZEI soil technicians provided compaction results of the in-place density and moisture by means of a field nuclear gauge as defined by ASTM D 6938. All CQA testing was performed in accordance with the approved CQA Plan. No failing results were documented in this final report and any defects were removed and or re-worked until a passing field test was documented. The typical surface impoundment section is a follows:

1. Prepared subgrade surface compacted to minimum 90 percent relative maximum dry density;
2. Subgrade anchor ballast system to protect against wind up-lift;
3. GCL; and

#### 4. 60-mil (smooth) HDPE Liner.

Earthwork was constructed in accordance with the approved CQA Plan and design drawings. In this particular design the 60-mil HDPE liner and the GCL were the primary containment geosynthetic materials.

#### 3.4 CQA/CQC Project Objectives:

ZEI's Construction Quality Assurance (CQA) program objectives during construction were as follows:

1. Provide quality control procedures and a quality assurance program to demonstrate that the Hawes Composting Facility design was properly implemented by performing monitoring, inspections, and testing during all phases of construction.
2. Prepare and maintain documentation which demonstrated that the design has been implemented and the performance requirements had been met.
3. Serve as a reference source for personnel who performed and monitored the construction activities.
4. Establish lines of communication and responsibilities for all personnel.

The CQA/CQC program used by ZEI included continuous oversight to ensure the construction means and methods met the project requirements; that observations and testing procedures were implemented by qualified personnel; that procedures were in compliance with the approved project documents, applicable regulations, standards, and project specifications; and that all work, including the final product, was appropriately documented, filed, and made readily available for review. Implementation of the quality control (QC) program consisted of tests and observations during construction that assisted Nursery Products in producing the required quality product. ZEI's CQA/CQC program ensured that every aspect of the approved project specifications were followed to the project specifications and industry standards. ZEI's detailed CQA program provided evidence that the liner system was manufactured, delivered, installed and tested in accordance with the approved specifications. All geosynthetic liner components of the project and methods of inspection covered in this CQA Construction Report are described in detail hereafter.

### ***SECTION 4.0 CONSTRUCTION QUALITY ASSURANCE DOCUMENTATION***

#### **4.1 Construction Contractor, Key Members, and Suppliers:**

##### *4.1.1 Project Designer and General Contractor:*

Geosyntec Consultants was responsible for the design and technical specification preparation for the HCF. The Engineer of Record certified that the design met the construction and operational requirements of the Regulator's and Owner, and met or exceeded other regulatory requirements. Geosyntec Consultants is located at 10875 Rancho Bernardo Road, Suite 200, San Diego, Ca. 92127.

Quantum Contractors was responsible for the earthworks, mechanical, piping, and overall quality control as it relates to workmanship and materials. Quantum Contractors is located in Blue Jay, CA 92317. Contractor's License # 840155.

#### *4.1.2 Construction Manager:*

Nursery Products, the Owner, ensured the construction of the facility in accordance with the design drawings and specifications. They implemented additional quality control and quality assurance procedures and techniques necessary for construction.

#### *4.1.3 Geosynthetic Installation Contractor:*

EC Applications was contracted by Nursery Products to supply and install all geosynthetics components for this project. EC Applications is a licensed geosynthetic installation contractor located at 415 W. Traft Ave, Suite H, Orange, CA 92865.

The Geosynthetic Materials were manufactured then delivered to the Dalton Storage Yard for protective storage until transferred to the project site.

#### *4.1.4 Material Manufacturers:*

##### **4.1.4.1 HDPE Geomembrane Liner**

Agru America manufactured and supplied all 60-mil smooth HDPE liner and welding rod used for construction. Quality Control (QC) during the manufacture of the geomembrane was strictly monitored by Agru's in-house testing program.

##### **4.1.4.2 GCL**

Cetco Lining Technologies manufactured and supplied all of GCL used in construction. Cetco Bentomat ST materials are manufactured from a premium grade high bentonite powder. All rolls delivered to the site were accepted by the ZEI CQA representative. For quality assurance purposes, each roll was audited and identified with the manufacturer's roll number to cross reference with material certifications to ensure that each roll deployed met or exceeded the manufacturer's and project specifications. The GCL used in construction exceeded the project requirements.

##### **4.1.4.3 Geotextile**

The geotextile that served as a cushion and drainage filter fabric was manufactured by Skaps Industries. The 8.0 oz. geotextile was manufactured with 100-percent continuous filament polyester, nonwoven, needle punched, and engineered fabric.

#### *4.1.5 Independent Geomembrane Laboratory Testing:*

Precision Geosynthetic Laboratories (PGL) of Anaheim, California was contracted by ZEI as the third party geosynthetic-testing laboratory of record. The HDPE seam welds and material conformance properties were tested and reviewed for compliance with the approved project technical specifications. PGL is a certified geosynthetic laboratory, accredited by the Geosynthetic Accreditation Institute (GAI). See Appendix D Geosynthetic Independent Laboratory Test Results

Services performed by PGL included:

#### Destructive Seam Strength Testing (a total of 18 tests performed):

Seam Peel Adhesion ..... ASTM D6392  
Shear Bonded Strength, ..... ASTM D6392

Conformance destructive seam sampling was conducted in accordance with project technical specifications. All geomembrane seams samples or destructive samples (DS) were tested in accordance to the project specifications and determined to meet and or exceed the requirements.

## **4.2 Construction Quality Control/Quality Assurance**

The CQC/CQA methods used during liner construction consisted of a planned system of inspection and documentation performed independently of each other by both ECA and ZEI. This CQA monitoring program included daily monitoring, reporting, verification, audits and evaluations of materials and product workmanship necessary to determine and document the quality of the materials and installation. The CQA methods used to assess construction was in accordance with the construction drawings and project specifications.

*4.2.1 Manufacturer's Certifications:* Prior to accepting the engineered geosynthetic materials for use in construction, geosynthetic material manufacturers were required to submit all Manufacturer Quality Assurance/Manufacturer Quality Control (MQA/MQC) test results. The MQA/MQC test results included results from in-house testing on all rolls of GCL and HDPE liner before delivery. After manufacturer approval, rolls were then prepared and delivered to the site for use in construction. The manufacturer roll certification lists and supporting test results were submitted to the CQA Representative for final review and approval. As the materials were delivered to the project site, each roll of material was visual inspected, documented, and inventoried for material description, manufacturer's identification control number, roll number, material weight, and dimension. The field inventory was then checked against the submitted manufacturer's MQA data to verify that the delivered material had been tested by the manufacturer and that it met or exceeded project requirements. When the review was complete and approved, an approved roll list was prepared. All geosynthetic materials delivered

to the site met or exceeded the minimum project requirements.

- 4.2.2 *Agru America CQA/CQC Manufacturing Program:* Agru America's In house Quality Control (QC) program is an ongoing system of monitoring and testing materials as they are manufactured. The manufacturing QC program is essential to manufacturing and is strictly adhered to by all individuals involved in the process. Agru's QC department reserved the right to reject raw materials or manufactured materials not meeting their standards and project specifications.

The Agrus' Quality Assurance (QA) program is a process of verifying compliant materials with acceptable procedures for training, manufacturing, testing, materials handling, data review, and distribution. The QA department verifies the validity of the test results, the correctness of the test procedures, the operation of test equipment, and the ongoing training of their QC personnel.

Agrus' QC laboratory is fully equipped to perform a wide range of conformance tests on all types of geomembranes. Samples are die cut with hydraulic press to preserve the uniformity of testing. Equipment used for physical testing included differential scanning calorimetry, density gradient columns, melt flow index testers, Microtome, stereo microscopes, and index friction.

QC test results were stored in a computer database for ease of retrieval. Hard copies were reviewed then submitted to ZEI's CQA Representative for final approval.

- 4.2.3 *Waste Pile and Surface Impoundment Subgrade Certification:* Prepared soil subgrade processing, placement, compaction, inspection and conformance evaluations were monitored by ZEI. Quality Assurance reviews and supervision were performed by ZEI. Continuous monitoring and testing was performed regularly to test for moisture content and percent compaction. Prior to geosynthetic material placement, a visual soil surface inspection was performed. Each subgrade certification was conducted by an Owner representative, the geosynthetic installation contractor, and ZEI's CQA representative. All parties ensured that no deleterious material that could potentially damage the liner system was present in the areas to be lined. This included a visual inspection for rocks, yielding soils, moisture content, structural abnormalities, or any deleterious materials on the subgrade surface. Soil surface approval was made before GCL and HDPE liner was deployed over any subgrade or structure.

#### 4.2.4 *Geosynthetic Testing Documentation, Materials, and Installation Methods:*

##### 4.2.4.1 GCL, HDPE Liner and Welding Rod

CETCO GCL: Ninety Six (96) rolls of Bentomat ST GCL or 216,600 square feet of GCL were delivered to the HCF and accepted by the CQA Representative after a complete QA review of the manufacturer's certifications and cross-referencing with specifications. For Quality Control/Quality Assurance purposes, each roll was identified with the manufacturer's roll number to cross reference with material certifications and roll conformance testing. As each roll was deployed in the field, a visual inspection was performed to locate any imperfections from the manufacturing processes and/or deployment damage. All imperfections were located, documented, and repaired.

Agru HDPE Liner: Twenty Two (22) rolls of Agru 60-mil HDPE liner or 273,240 square feet of HDPE were delivered to the HFC and accepted by the CQA Representative after a complete QA review of the manufacturer's certifications and cross-referencing with specifications. For Quality Control/Quality Assurance purposes, each roll was identified with the manufacturer's roll number to cross reference with material certifications and roll conformance testing. As each roll was deployed in the field, a visual inspection was performed to locate any imperfections from the manufacturing processes and/or deployment damage. All imperfections were located, documented, and repaired. All repairs were non-destructively tested for compliance with the project specifications.

##### 4.2.4.2 Liner Deployment

The geosynthetic 60-mil liner is the primary liner for the surface impoundments. To provide additional resistance to downward migration of water and to provide a smooth surface on which to install HDPE liner, a GCL was included in the liner system section beneath the HDPE liner. The GCL consists of powdered bentonite clay sewn in between two layers of synthetic geotextile fabric. In addition, the GCL provides a hydraulic conductivity two orders of magnitude lower than the prescriptive liner requirements. The GCL helps to protect the vadose zone if a leak were to occur in the HDPE liner because the GCL will hydrate to "self-seal" a leak in the liner system.

The surface impoundment liner section is ballasted on the impoundment floor as designed, and anchored around the perimeter of the impoundment by a 2-foot minimum horizontal run at the top of slope followed by a 9-foot minimum run of liner buried at the downward slope inclination of approximately 2:1 (horizontal/vertical) so that the edge of the liner is a minimum of 4-feet below the ground surface.

Deployment of the 60-mil HDPE liner was performed using a forklift equipped with a deployment spreader bar for placement ease. The liner was placed in such a way that no damage occurred to the liner during placement. Wind was carefully monitored during deployment to ensure that sufficient personnel were present to secure the liner if the need arose. Liner temperatures were also monitored closely. If ambient liner temperatures (measured 6 inches above liner surface) would have approached 32 °F or 122°F then welding activities would have been shut down. However, liner temperatures as measured by a field thermometer did not approach the limits specified.

All deployed panels were placed with a minimum 6-inch panel overlap. The proper overlap was marked on the HDPE liner roll to aid the deployment crew in straightening the panels. Immediately after geomembrane panels running through anchor trenches or at toes of slopes/walls were welded, sandbags were placed along the entire length of the line to prevent stress-bridging at those locations. All boundary HDPE material was placed in an approved anchor trench and secured with approved select fill soil. During panel deployment, individual panels were marked with the deployed footage, identified with a unique panel number, and the manufacturers roll number.

This *Section 4.2.4.2 Liner Deployment* (paragraph 2) details the floor ballast and perimeter anchor trench construction and does not relate to the bottom Lysimeter. The surface impoundment perimeter anchor trench system was constructed in accordance with the approved drawings Section C and E, sheet 6 of 9. The perimeter anchor system is secured in-place with a minimum of 4-feet of compacted select fill above the liner.

The surface impoundment liner system is ballasted around the perimeter of the impoundments by a 2-foot minimum horizontal run at the top of the slope followed by an additional 9-foot length of liner buried at a downward sloping inclination of 2:1 (horizontal: vertical) such that the leading edge is below the basin floor. The anchorage system was constructed per Detail C, sheet 6 of 9.

#### 4.2.4.3 Pre-Qualifying Trial Welds

Prior to production seaming or repair work, each welder was required to perform a start-up trial weld. Trial welds were conducted for each machine/operator combination, per working period, under identical work conditions and environment. The trial welds were performed using the same material as the production liner and were then tested for shear and peel seam strengths. Upon completion of a passing trial, the technician commenced with welding.

#### 4.2.4.4 Fusion Welding

The most efficient and frequently used method to join HDPE panels is the fusion weld (split wedge weld). The split wedge welder utilizes an electrically heated copper wedge. The heated wedge is regulated by a programmable controller with an audible off temperature alarm and a variable speed drive that operates at specified speeds depending on panel mil thickness and machine model. The heated wedge passes between the top and bottom edge of the adjacent HDPE panels and two nip rollers compress the heated material together (fusion). This allows the machine to propel itself along the seam at a constant rate. Located between the split wedge and the two rollers is a stinger which forms a hollow chamber along the length of the weld, making it possible for a non-destructive air pressure test to be conducted after the seam was completed.

Seaming technicians continuously cleaned the material directly ahead of the wedge to remove blown dust ahead of the welder. Due to the high expansion rates of HDPE liner, it was necessary to "trim the lap" of the seam that would otherwise have resulted in a hump or a wrinkle along the seam.

#### 4.2.4.5 Extrusion Welding

The other method of joining panels, and more commonly used to make repairs on HDPE liner, is extrusion welding. Extrusion welds are generally used in situations where wedge welding is inappropriate. This welding process introduces a molten resin bead along the edge of overlapped HDPE material. Located on the barrel of the extrusion gun is a hot air preheating gun that heats the weld area directly before the extrudate is applied. The molten resin bead results then in a partially liquefied parent material. This homogeneous bond between the surface of the parent material and the molten welding rod, or bead, is typically stronger than the surrounding material. The extrusion machine was equipped with gauges that relay temperature readings from the apparatus.

Each extrusion weld was prepared in the following manner. The HDPE patch or overlap to be welded was heat tacked to the parent sheet using a hot air (leister) gun. Technicians then ground a one-inch wide by continuous area on both the top and bottom sheets along the area to be welded. All tacking and grinding was carefully performed to ensure no damage was done during repair (e.g. hot air gun burns or over grinding). At the same time, the CQA Representative ensured that all of the surface areas to be welded were properly ground to ensure the proper bond occurred between surfaces. Subsequently, the molten welding rod (or bead) was applied to the specified area. Ground areas were monitored to ensure that no over grinding was performed and that these areas remained free of dust. This was achieved by restricting the grinding technician to a reasonable distance from the welding technician and the extrusion gun. All welding rods were wiped clean of dust before utilizing it in the machine.

#### 4.2.4.6 CQA Documentation

Pertinent liner documentation was recorded on the liner. Included in the documentation were destructive and non-destructive testing, air channel testing on fusion welds, and vacuum box testing on extrusion welds, and the technician who repaired the defect. This information was transferred to the appropriate documentation forms. In addition, the CQA Representative monitored 100% of all testing and noted complete details in field CQA documentation. Panel placements with the corresponding roll numbers, panel lengths, and panel identification were recorded at the time of deployment. A complete list of repairs was recorded.

All production seaming was monitored by the CQA Representative, who documented seam numbers, welder identifications, machine identifications, speeds and times of operation, and machine temperatures. The seam control documentation was initially written on the liner and then transferred to CQA documentation. Each welder was tracked for linear feet of production weld in order to control destructive sampling frequencies.

CQA report forms were completed for subgrade certifications, completion certifications, inventory, panel placement, trial welds, defects, destructive seam testing, seaming and non-destructive testing, and daily inspection reports. A daily CQA review consisting of a conformance audit, accuracy, and compliance with the project specifications was conducted.

#### 4.2.4.7 Non-Destructive Testing

All HDPE liner seams and repairs were 100% non-destructively tested using either one of the two standard testing methods. Tests performed depended on the welding method applied to the Liner Material.

##### 4.2.4.7.1 Air pressure Testing

Air pressure testing was performed on all wedge weld seams. This procedure involved sealing off both ends of the seam and inserting a manometer (or pressure gauge) into the air channel. The manometer apparatus included a hollow stem needle attached to a pressure gauge needle and air-fitting for inflation of the channel. Each air channel was pressurized to approximately 27 - 30 psi for a period of no less than five minutes. The channel maintained the initial pressure with no more than 3-psi drop or a failure was designated to the seam. Upon completion of the air test, the air was released from the opposite end of the manometer setup. This ensured that the full seam length was pressurized and therefore tested. Test results were documented on the liner and then later transcribed to the corresponding CQA forms after the seam was approved by the CQA Representative. All non-destructive test holes were repaired at ends of test channel.

#### 4.2.4.7.2 Vacuum Box Testing

Extrusion welds were primarily tested using a vacuum box chamber. This nondestructive test used a rigid, transparent box with a soft rubber gasket that was equipped with a small vacuum motor to create a negative pressure zone just above the liner. This allowed for a visual confirmation of the seam integrity. Extrusion welds were allowed to cool for at least five minutes prior to testing. The section to be tested was wetted with soapy water and the vacuum box was placed over the seam, thus energizing the vacuum to observe any defects that appeared. A minimum value of 3 psi on the pressure gauge was obtained for approximately 10-15 seconds. If there was a hole in the liner, it would have been observed by small bubbles foaming up from the hole. If no bubbles were observed, the operator would reposition the box to the next section to be tested. A vacuum box test was approved when the CQA Representative observed that no bubbles were produced and initialed the test area.

#### 4.2.4.8 Destructive Testing and Sampling

Destructive seam sampling was another method of ensuring seam quality. Samples were taken directly from in-place seams on the geomembrane. For every 500 linear feet of seam welded, destructive samples were removed and tested for peel and shear strengths. Project specifications also allowed the frequency of sampling to be decreased or increased based on previous seam test results. This was performed for every operator/machine pair used during installation. As stated, destructive samples were taken in accordance with manufacturer's recommendations and the project specifications. Samples were appropriately marked along the seam and identified with a unique destructive identification number, operator, weld machine settings, machine number, date, seam identification, and feature location. Each destructive sample was given a specific code so it could be easily referenced and tracked.

The destructive samples taken were approximately 1-foot by 3 ½ -feet in size with the seam centered. The first 18" portion of the sample was for field-testing and seam strength evaluation. From this 18" sample, ten (10) coupons were cut and tested in the field before it was sent to the laboratory. The next one-foot portion of each sample was sent to PGL for third party testing. The next one-foot section was kept for project archives.

A total of eighteen (18) destructive samples were taken from the surface impoundment A and B.

#### 4.2.4.9 Field As-Built Drawings

A field panel layout (as-built) drawing was completed after each liner layer was done. The field as-built drawings shows panel location and orientation, panel numbers, destructive samples, repair locations, sumps, and pipe extensions.

#### 4.2.4.10 Compliance/Non-compliance and Corrective Actions

Any failure to meet the aforementioned standard and criteria in sections 4.2.4.7 Non-Destructive Testing and 4.2.4.8, Destructive Testing and Sampling, constituted non-compliance. Non-compliance for a non-destructive test was any failure to pass criteria set to determine passing seam or patched area. A corrective action in the case of a failed vacuum box test was to patch the defective area and retest the newly repaired area using the same method. A pressure test failure involved locating the failure along the seam, cutting the failed area out, and performing a pressure test on either side of this zone. Extruded patches were repaired over the failed area then vacuum box tested for compliance.

All destructive seam sample test results, laboratory or field, did meet or exceed project specifications. Five coupons were tested in peel adhesion and five tested for shear strength in accordance with ASTM D 6392.

### ***SECTION 5.0 SUMMARY***

#### **5.1 General**

It should be noted that the test specimens and test samples used for this report are believed to be representative of the material produced under the designation herein stated. However, these results are indicative of only the specimens that were actually tested. The testing herein is based upon accepted industry practices for construction QA/QC and Laboratory procedures as well as the test methods listed. It should also be noted that ZEI observed, monitored, and performed CQA testing to the limitations of one person and cannot be responsible for operational and maintenance performance of the liner system.

ZEI takes no responsibility for property lines, boundaries, or construction of the ground water wells but rather assumes their accuracy for purposes of this review.

AEI CASC conducted the final as-built survey and they are a state licensed professional surveyor. The survey records are included in this report as a reference and provide evidence that the HCF site was constructed to the lines and grades in the design drawings and CQA Plan.

A revised "Final As-Built Survey" for the Waste Pile (East and West Portion) and surface impoundments is included for clarification and record drawings. The survey was conducted at the completion of all work by the Owner, and includes all final in-place elevations, lines and grades for the entire constructed facility. The revised Nursery Products Hawes Composting Facility Post Grading Survey is a substitution for Appendix E. This revised as-

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built survey drawing is all inclusive and illustrates the entire Hawes Compost Facility including final grades, lines and elevations for the Waste Pile (both East and West Portion) and Surface Impoundments A and B (See **Appendix E** Waste Pile & Surface Impoundment As-built Survey).

**Appendix F**, ZEI CQA Daily Summary Reports and Photo Documentation presents documentation prepared by the CQA Representative from field records and used to assist ZEI in preparing this certification report. These forms are a crucial part of the ZEI CQA program and provide our field inspectors/engineers with a planned system for audits and inspections. Each form was designed to capture all pertinent field activities as related to the installation of all geosynthetics. These forms are designed to prompt CQA activities, provide a database for testing, inspection, and track noncompliance elements. The ZEI CQA program has proven successful on many large and very challenging geosynthetic liner systems. This program has also been utilized to train regulatory, state and city personnel. Reproduction of this report, forms, and CQA data will require written authorization from Zero Energy Institute, LLC.

The findings and professional opinions contained in this report were prepared in accordance with generally accepted professional principles and practices for construction performed in the greater Southern California region. ZEI and their subconsultants make no other warranty, expressed or implied.

## **5.2 Minor Deviations**

1. The most southerly 12 acres of the Waste Pile Composting Area was not completed as shown on the post grading as-built survey (See **Appendix E**).
2. Upstream Stormwater Control drainage channel was completely lined with a light armored, ¼ ton rip-rap placed approximately 3-feet thick throughout the channel. Lining the entire channel with rip-rap was determined to be an acceptable substitution for the soil erosion bank protection.

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**SECTION 6.0 CQA CERTIFICATION**

I hereby acknowledge that the double liner system installed for Nursery Products at the Hawes Composting Facility, San Bernardino, California is constructed in general compliance with the project designs and specifications. I further submit that the information and data presented in this report are true and accurate to the best of my knowledge.

Printed Name of CQA Project Manager

Shannon Goodrich

Signature of the CQA Project Manager

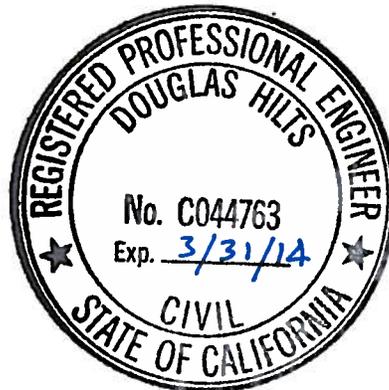
Shan Goodrich

Printed Name of CQA Engineer

Douglas Hilts

Signature of the CQA Engineer

DH



# Appendix A

Sladden Engineering  
CQA Earthworks Testing for the Waste Pile  
Composting Area &  
Surface Impoundments A and B

County of San Bernardino – Environmental Management Group  
 BUILDING AND SAFETY DEPARTMENT

ENGINEERED – GRADING INSPECTION REPORT

Owner Nursery Products Index No. \_\_\_\_\_ Tract No. APN 0492-021-2  
 Job Address 14479 Cougar Rd. Hemet 92342 Permit No. B201200437

ROUGH GRADING INSPECTION

ENGINEERING GEOLOGIST (If required) N/A

Grading on the site was completed in accordance with the approved Engineering Geology Report. Cut slopes are stable at their graded inclinations.

CERTIFIED LOT NOS. \_\_\_\_\_ DATE \_\_\_\_\_  
 GEOLOGIST \_\_\_\_\_ REGISTRATION NO. \_\_\_\_\_

SIGNATURE \_\_\_\_\_ PHONE NO. \_\_\_\_\_

ADDRESS \_\_\_\_\_

REMARKS \_\_\_\_\_

SOILS ENGINEER

All fills were installed upon properly prepared base material, benched and compacted in compliance with Section 7010, U.B.C., and where the report of an engineering geologist has recommended the installation of buttress fills or other measures, such work has been completed in accordance with the approved design. Fill settlement monitoring (if any) has been completed on all certified lots.

UNSATISFACTORY SOILS  YES  NO LOT NOS. \_\_\_\_\_

CERTIFIED LOT NOS. \_\_\_\_\_ DATE 6/19/12

SOILS ENGINEER Brett Anderson - Sladden Engineering REGISTRATION NO. 45389

No. C 45389 SIGNATURE \_\_\_\_\_ PHONE NO. (951) 845-7743

Exp. 9-30-2012 ADDRESS 150 Egan Avenue, Braumont CA 92223

REMARKS \_\_\_\_\_

GRADING ENGINEER

The rough grading has been completed in accordance with the approved plans including: grading to approximate final elevations; properly installed swales and terraces ready for paving; berms installed; and required drainage slopes provided; and where reports of an engineering geologist and/or soils engineer have been prepared, the recommendations contained therein have been followed.

CERTIFIED LOT NOS. Phase Western Portion DATE 8/14/2012

GRADING ENGINEER Douglas Hilts, Hilts Consulting Group, Inc. REGISTRATION NO. C44763

No. C44763 SIGNATURE \_\_\_\_\_ PHONE NO. 909-590-5200

Exp. 3/31/14 ADDRESS 16716 Quail Country Ave., Chino Hills, CA 91709

REMARKS Western compost area portion as designated on location Plan.

FINAL GRADING INSPECTION

The grading has been satisfactorily completed in accordance with the approved plans. All required drainage devices have been installed: slope planting established and adequate provisions have been made for drainage of surface waters from each building site. The recommendations of the soils engineer and/or engineering geologist (if such persons were employed) have been incorporated in the work.

CERTIFIED LOT NOS. \_\_\_\_\_ DATE \_\_\_\_\_

GRADING ENGINEER \_\_\_\_\_ REGISTRATION NO. \_\_\_\_\_

SIGNATURE \_\_\_\_\_ PHONE NO. \_\_\_\_\_

ADDRESS \_\_\_\_\_

REMARKS \_\_\_\_\_

DEPARTMENT USE ONLY:

N/A As-Graded Geology Report Reviewed By (Name) \_\_\_\_\_ Review Date \_\_\_\_\_

Compaction Report Reviewed By (Name) \_\_\_\_\_ Review Date \_\_\_\_\_

Rough Grade Inspector (Signature) \_\_\_\_\_ Date \_\_\_\_\_

Final Grade Inspector (Signature) \_\_\_\_\_ Date \_\_\_\_\_

June 6, 2012

-2-

Project No. 622-12006

12-06-024

**Laboratory Tests:** The moisture-density relationships for the tested materials were determined in the laboratory in accordance with ASTM Test Method D 1557-91.

If there are any questions regarding this report or the testing summarized herein, please contact the undersigned.

Respectfully submitted  
**SLADDEN ENGINEERING**

Brett L. Anderson  
Principal Engineer

Grading/jg



Copies      4/ Zero Energy Institute, LLC



# Sladden Engineering

45090 Golf Center Parkway, Suite F, Indio, CA 92201 (760) 863-0713 Fax (760) 863-0847  
6782 Stanton Avenue, Suite A, Buena Park, CA 90621 (714) 523-0952 Fax (714) 523-1369  
450 Egan Avenue, Beaumont, CA 92223 (951) 845-7743 Fax (951) 845-8863  
800 E. Florida Avenue, Hemet, CA 92543 (951) 766-8777 Fax (951) 766-8778

June 6, 2012

Project No. 622-12006

12-06-024

Zero Energy Institute, LLC  
Zero Energy International, LLC  
3550 Windsor Road  
Oceanside, California 92056

Project: Phase 1 Site Improvements  
Hawes Composting Facility  
APN 0492-021-24  
Hinkley/Kramer Junction Area  
San Bernardino County, California

Subject: Supplemental Compaction Report

Ref: Update Geotechnical Investigation prepared by Geosyntec Consultants dated  
January 31, 2012; Project No. SC0554  
Compaction Report prepared by Sladden Engineering dated May 15, 2012, Project  
No. 622-12006, Report No. 12-05-020

Summarized in this report are the results of in-place density tests performed at the subject site during the grading of the western portion of Phase 1 along with pertinent observations. The Hawes Composting facility project site is located west of Barstow, approximately 10 miles west of Hinkley Road, 12.3 miles east of Kramer Junction, one mile south of State Route (SR) 58, and one mile west of Helendale Road in the County of San Bernardino, California. Testing was performed during the rough grading of the western portion of the project site. The testing performed during the grading of the eastern portion of the site was summarized on the above referenced Compaction Report.

Field testing was performed on May 25, 2012. Testing indicates that a minimum of 90 percent relative compaction was attained in the areas tested, as required by the project specifications. The passing test results indicate compliance with the project specifications at the tested locations and depths but are no guarantee or warranty of the contractors work.

**Field Tests:** In-place moisture/density tests were performed using a nuclear density gauge in accordance with test methods ASTM D 2922 and ASTM D 3017. A total of 9 additional density tests were performed. Test results are summarized on the attached data sheet. The approximate test locations are indicated on the attached plan.

County of San Bernardino - Environmental Management Group  
 BUILDING AND SAFETY DEPARTMENT  
**ENGINEERED - GRADING INSPECTION REPORT**

Owner Nursery Products Index No. \_\_\_\_\_ Tract No. 12N0412-001 24  
 Job Address 14479 Covages Rd. Hunt 92592 Permit No. B201200431

**ROUGH GRADING INSPECTION**

**ENGINEERING GEOLOGIST (If required)** N/A

Grading on the site was completed in accordance with the approved Engineering Geology Report. Cut slopes are stable at their graded inclinations.

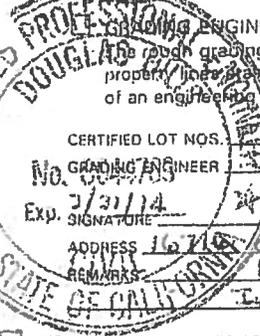
CERTIFIED LOT NOS. \_\_\_\_\_ DATE \_\_\_\_\_  
 GEOLOGIST \_\_\_\_\_ REGISTRATION NO. \_\_\_\_\_  
 SIGNATURE \_\_\_\_\_ PHONE NO. \_\_\_\_\_  
 ADDRESS \_\_\_\_\_  
 REMARKS \_\_\_\_\_

**SOILS ENGINEER**

All fills were installed upon properly prepared base material, benched and compacted in compliance with Section 7010, U.B.C., and where the report of an engineering geologist has recommended the installation of buttress fills or other measures, such work has been completed in accordance with the approved design. Fill settlement monitoring (if any) has been completed on all certified lots.



YES  NO LOT NOS. \_\_\_\_\_  
Phase 1 - Eastern Half DATE 5/16/12  
Brett Anderson - Suddex Engineering REGISTRATION NO. 45389  
 SIGNATURE \_\_\_\_\_ PHONE NO. (951) 845-7742  
 ADDRESS 450 Egan Avenue, Beaumont, CA 92543



**Grading ENGINEER**  
 The rough grading has been completed in accordance with the approved plans including: grading to approximate final elevations; proper joint based; swales and terraces ready for paving; berms installed; and required drainage slopes provided; and where reports of an engineering geologist and/or soils engineer have been prepared, the recommendations contained therein have been followed.

CERTIFIED LOT NOS. Phase 1 - Eastern Half DATE 5/25/2012  
 GRADING ENGINEER Douglas Hills - Hills Consulting Group, Inc. REGISTRATION NO. G 44763  
 SIGNATURE \_\_\_\_\_ PHONE NO. (909) 570-5200  
 ADDRESS 14118 Quail Country Ave., Chino Hills, CA 91709  
 REMARKS Limited to eastern half Waste Pile Campsite Area and Surface Impairments A&B. Property lines by others per attached Survey.

**FINAL GRADING INSPECTION**

The grading has been satisfactorily completed in accordance with the approved plans. All required drainage devices have been installed; slope planting established and adequate provisions have been made for drainage of surface waters from each building site. The recommendations of the soils engineer and/or engineering geologist (if such persons were employed) have been incorporated in the work.

CERTIFIED LOT NOS. \_\_\_\_\_ DATE \_\_\_\_\_  
 GRADING ENGINEER \_\_\_\_\_ REGISTRATION NO. \_\_\_\_\_  
 SIGNATURE \_\_\_\_\_ PHONE NO. \_\_\_\_\_  
 ADDRESS \_\_\_\_\_  
 REMARKS \_\_\_\_\_

**DEPARTMENT USE ONLY:**

N/A As-Graded Geology Report Reviewed By (Name) \_\_\_\_\_ Review Date \_\_\_\_\_  
 Compaction Report Reviewed By (Name) \_\_\_\_\_ Review Date \_\_\_\_\_  
 Rough Grade Inspector (Signature) \_\_\_\_\_ Date \_\_\_\_\_  
 Final Grade Inspector (Signature) \_\_\_\_\_ Date \_\_\_\_\_



# Sladden Engineering

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800 E. Florida Avenue, Hemet, CA 92543 (951) 766-8777 Fax (951) 766-8778

May 15, 2012

Project No. 622-12006  
12-05-020

Zero Energy Institute, LLC  
Zero Energy International, LLC  
3550 Windsor Road  
Oceanside, California 92056

**Project:** Phase 1 Site Improvements  
Hawes Composting Facility  
APN 0492-021-24  
Hinkley/Kramer Junction Area  
San Bernardino County, California

**Subject:** Compaction Report

**Ref:** Update Geotechnical Investigation prepared by Geosyntec Consultants dated  
January 31, 2012; Project No. SC0554

Summarized in this report are the results of in-place density tests performed at the subject site during the grading of Phase 1 (eastern portion) and along with pertinent observations. The Hawes Composting facility project site is located west of Barstow, approximately 10 miles west of Hinkley Road, 12.3 miles east of Kramer Junction, one mile south of State Route (SR) 58, and one mile west of Helendale Road in the County of San Bernardino, California. Testing was performed during the rough grading of the eastern portion of the project site and within the detention pond areas A & B.

Field testing was performed from February 20, 2012 through May 10, 2012. Testing indicates that a minimum of 90 percent relative compaction was attained in the areas tested, as required by the project specifications. The passing test results indicate compliance with the project specifications at the tested locations and depths but are no guarantee or warranty of the contractors work.

**Field Tests:** In-place moisture/density tests were performed using a nuclear density gauge in accordance with test methods ASTM D 2922 and ASTM D 3017. A total of 103 density tests were performed. Test results are summarized on the attached data sheets. The approximate test locations are indicated on the attached plan.

**Laboratory Tests:** The moisture-density relationships for the tested materials were determined in the laboratory in accordance with ASTM Test Method D 1557-91.

May 15, 2012

-2-

Project No. 622-12006

12-05-020

If there are any questions regarding this report or the testing summarized herein, please contact the undersigned.

Respectfully submitted  
**SLADDEN ENGINEERING**

Brett L. Anderson  
Principal Engineer

Grading/gl



Copies 4/ Zero Energy Institute, LLC

# Test Results

Project Name: Hawes Composting Facility - Phase 1				Project No.: 622-12006			
Location: Hinkley/Kramer Junction, San Bernardino County, Ca.				Report No.: 12-05-020			
Test No.	Date Tested	Location	Elevation	Dry Density In place	% Moisture In Place	Relative Compaction	Maximum Density
1	2/20/2012	Per Plan Test Site East Side	NG	119.2	6.0	92	130.0
2	2/20/2012	Per Plan Test Site East Side	1.0'	117.2	10.7	93	126.5
3	2/20/2012	Per Plan Test Site East Side	2.0'	117.1	11.1	93	126.5
4	2/20/2012	Per Plan Test Site East Side	2.0'	118.8	13.9	92	129.0
5	2/20/2012	Per Plan Test Site East Side	2.0'	121.2	9.3	93	130.0
6	2/20/2012	Per Plan Test Site East Side	NG	117.6	10.6	93	126.5
7	2/20/2012	Per Plan Test Site East Side	1.0'	114.8	14.5	91	126.5
8	2/20/2012	Per Plan Test Site East Side	2.0'	124.3	9.3	96	130.0
9	2/20/2012	Per Plan Test Site East Side	2.0'	119.9	10.1	92	130.0
10	2/20/2012	Per Plan Test Site East Side	1.0'	125.1	8.4	94	133.5
11	2/20/2012	Per Plan Test Site East Side	2.0'	118.5	11.9	94	126.5
12	2/20/2012	Per Plan Test Site East Side	NG	123.2	7.3	92	133.5
13	2/29/2012	Per Plan Test Site East Side	2.0'	120.0	7.4	92	130.0
14	2/29/2012	Per Plan Test Site East Side	3.0'	122.8	8.5	94	130.0
15	2/29/2012	Per Plan Test Site East Side	1.0'	117.5	8.0	90	130.0
16	2/29/2012	Per Plan Test Site East Side	4.0'	117.8	13.1	93	126.5
17	2/29/2012	Per Plan Test Site East Side	4.0'	121.1	10.7	96	126.5
18	2/29/2012	Per Plan Test Site East Side	1.0'	119.0	7.0	92	130.0
19	2/29/2012	Per Plan Test Site East Side	4.0'	120.7	9.8	94	129.0
20	2/29/2012	Per Plan Test Site East Side	1.0'	119.7	8.8	92	130.0
21	2/29/2012	Per Plan Test Site East Side	3.0'	126.9	8.0	95	133.0
22	2/29/2012	Per Plan Test Site East Side	4.0'	119.1	8.9	92	129.0
23	2/29/2012	Per Plan Test Site East Side	1.0'	116.7	8.8	92	126.5
24	2/29/2012	Per Plan Test Site East Side	2.0'	117.4	8.5	93	126.5
25	2/29/2012	Per Plan Test Site East Side	3.0'	119.1	7.5	92	130.0
26	2/29/2012	Per Plan Test Site East Side	2.0'	118.5	10.9	94	126.5
27	2/29/2012	Per Plan Test Site East Side	3.0'	124.1	8.5	93	133.0
28	2/29/2012	Per Plan Test Site East Side	3.0'	120.6	7.8	93	130.0
29	2/29/2012	Per Plan Test Site East Side	2.0'	116.5	8.5	92	126.5
30	2/29/2012	Per Plan Test Site East Side	4.0'	119.5	10.3	94	126.5
31	2/29/2012	Per Plan Test Site East Side	2.0'	117.8	9.1	91	129.0
32	2/29/2012	Per Plan Test Site East Side	4.0'	119.2	8.2	92	129.0
33	2/29/2012	Per Plan Test Site East Side	1.0'	126.1	8.2	95	133.0
34	2/29/2012	Per Plan Test Site East Side	2.0'	126.6	8.4	95	133.0
35	2/29/2012	Per Plan Test Site East Side	2.0'	115.4	9.2	91	126.5
36	2/29/2012	Per Plan Pond Area B	SG	118.1	8.3	92	129.0
37	2/29/2012	Per Plan Pond Area B	SG	120.0	8.9	93	129.0
38	2/29/2012	Per Plan Pond Area B	SG	115.9	*6.9	90	129.0
39	2/29/2012	Retest #38	SG	117.5	**9.2	91	129.0
40	2/29/2012	Per Plan Pond Area B	SG	118.3	9.7	91	130.0
41	2/29/2012	Per Plan Pond B Sump	SG	121.2	11.4	94	129.0

# Test Results

Project Name: Hawes Composting Facility - Phase 1				Project No.: 622-12006			
Location: Hinkley/Kramer Junction, San Bernardino County, Ca.				Report No.: 12-05-020			
Test No.	Date Tested	Location	Elevation	Dry Density in Place	% Moisture in Place	Relative Compaction	Maximum Density
42	3/5/2012	Per Plan Pond Slope B	SG	116.3	11.6	92	126.5
43	3/5/2012	Per Plan Pond Slope B	SG	116.6	11.2	92	126.5
44	3/5/2012	Per Plan Pond Slope B	SG	119.9	6.6	92	130.0
45	3/5/2012	Per Plan Pond Slope B	SG	118.5	6.6	91	130.0
46	3/5/2012	Per Plan Pond Slope B	SG	124.5	6.4	96	130.0
<b>Sump B</b>							
47	4/2/2012	Per Plan	4.0'	119.0	7.2	92	130.0
48	4/2/2012	Per Plan Pond A Sump	SG	119.9	8.0	92	130.0
49	4/2/2012	Per Plan	2.0'	117.5	6.9	90	130.0
50	4/2/2012	Per Plan	3.0'	118.1	8.0	90	130.5
51	4/2/2012	Per Plan	6.0'	116.8	9.6	90	130.5
52	4/2/2012	Per Plan	3.0'	119.2	9.4	92	129.0
53	4/2/2012	Per Plan	5.0'	118.7	7.5	90	131.5
54	4/2/2012	Per Plan	3.0'	118.8	7.6	90	131.5
55	4/2/2012	Per Plan	1.0'	116.3	9.1	90	129.0
56	4/2/2012	Per Plan	6.0'	122.7	6.9	92	133.5
57	4/2/2012	Per Plan	2.0'	116.9	7.2	90	130.0
58	4/2/2012	Per Plan	2.0'	121.0	6.7	91	133.5
59	4/2/2012	Per Plan	1.0'	123.0	5.0	92	134.0
60	4/2/2012	Per Plan	2.0'	125.1	6.2	93	134.0
61	4/2/2012	Per Plan	1.0'	125.0	5.8	93	134.0
62	4/2/2012	Per Plan	2.0'	124.9	8.9	93	134.0
63	4/2/2012	Per Plan	2.0'	127.1	7.7	95	134.0
64	4/2/2012	Per Plan	1.0'	122.5	5.9	91	134.0
65	4/2/2012	Per Plan	1.0'	123.1	6.0	92	134.0
66	4/13/2012	Per Plan Pond A	On Slope	123.60	7.1	94	131.5
67	4/13/2012	Per Plan Pond A	BOP	129	6.3	96	134.0
68	4/13/2012	Per Plan Pond A	BOP	122.9	6.6	93	131.5
69	4/13/2012	Per Plan Pond A	BOP	125.9	10.4	96	131.5
70	4/13/2012	Per Plan Pond A	BOP	120.4	8.0	92	131.5
71	4/13/2012	Per Plan Pond A	BOP	116.7	9.7	92	126.5
72	4/13/2012	Per Plan Pond A	BOP	122.0	8.6	93	131.5
73	4/13/2012	Per Plan Pond A	BOP	129.6	8.3	97	134.0
74	4/13/2012	Per Plan Pond A	BOP	127.6	7.5	95	134.0
75	4/13/2012	Per Plan Pond A	BOP	123.4	6.7	94	131.5
76	4/13/2012	Per Plan Pond A	BOP	119.3	7.8	91	131.5
77	4/13/2012	Per Plan Pond A	On Slope	122.2	8.6	93	131.5
78	4/13/2012	Per Plan Pond A	On Slope	116.8	10.4	92	126.5
79	4/13/2012	Per Plan Pond A	On Slope	120.3	8.3	91	131.5
80	4/13/2012	Per Plan Pond A	On Slope	121.7	8.7	93	131.5
81	4/13/2012	Per Plan Pond A	On Slope	122.6	8.4	93	131.5
82	4/13/2012	Per Plan Pond A	On Slope	116.9	10.4	92	126.5
83	4/13/2012	Per Plan Pond A	On Slope	115.2	10.0	91	126.5
84	4/13/2012	Per Plan Pond A	On Slope	115.6	9.0	91	126.5
85	4/13/2012	Per Plan Pond A	On Slope	122.4	8.0	93	131.5
86	4/13/2012	Per Plan	2.0'	126.6	9.3	91	139.5

Tuesday, May 15, 2012

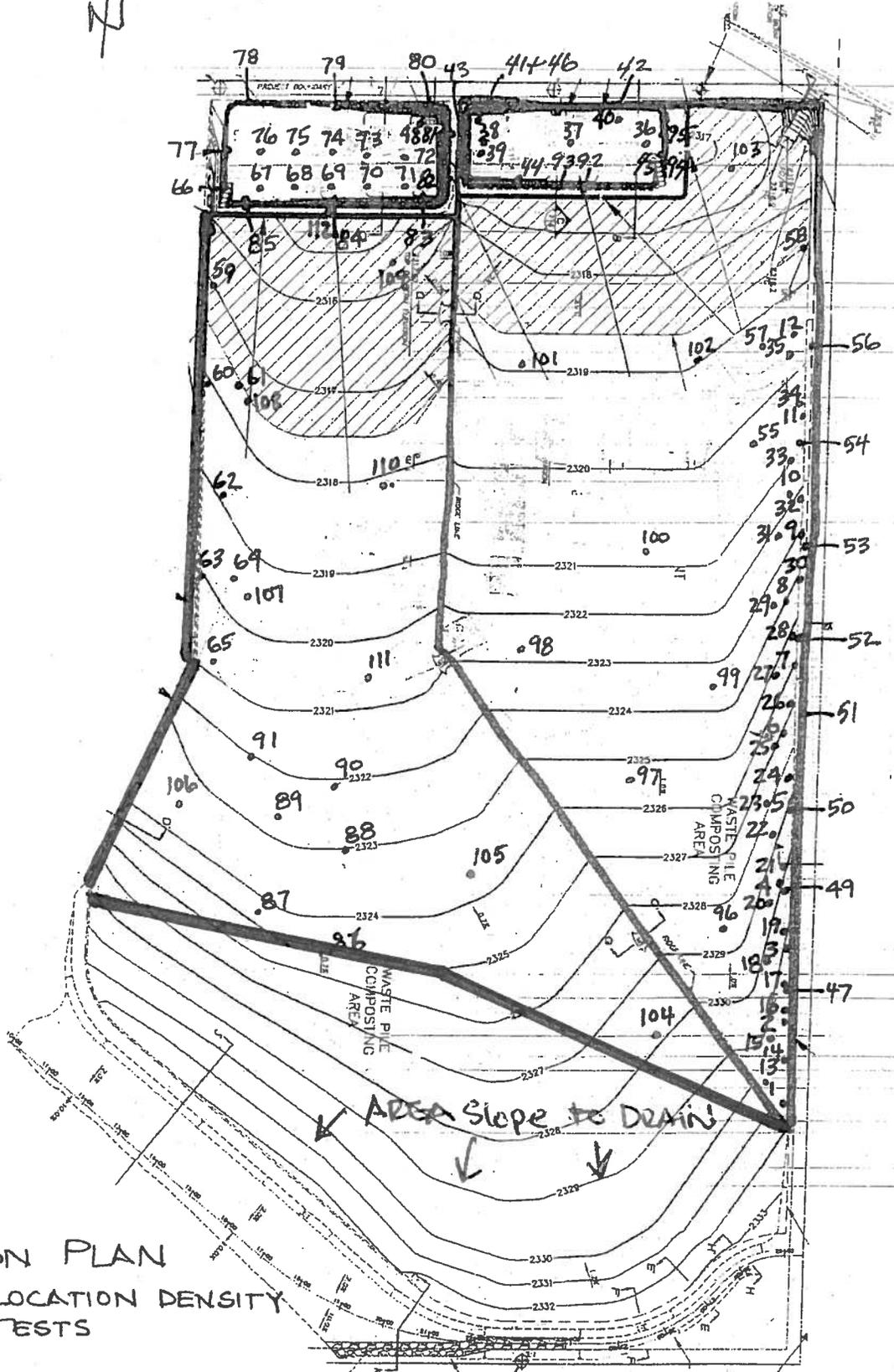
Sladden Engineering

# Test Results

Project Name: Hawes Composting Facility - Phase 1				Project No.: 622-12006			
Location: Hinkley/Kramer Junction, San Bernardino County, Ca.				Report No.: 12-05-020			
Test No.	Date Tested	Location	Elevation	Dry Density in Place	% Moisture In Place	Relative Compaction	Maximum Density
87	4/13/2012	Per Plan	1.0'	126.3	10.4	91	139.5
88	4/13/2012	Per Plan	SG	119.6	8.3	95	126.5
89	4/13/2012	Per Plan	0.5'	126.9	10.1	97	131.5
90	4/13/2012	Per Plan	SG	123.8	8.7	94	131.5
91	4/13/2012	Per Plan	1.5'	120.4	10.2	92	131.5
92	5/10/2012	Per Plan Pond B	SG	121.8	6.6	94	130.0
93	5/10/2012	Per Plan Pond B	SG	119.8	7.8	92	130.0
94	5/10/2012	Per Plan Pond B	SG	122.3	8.4	92	133.5
95	5/10/2012	Per Plan Pond B	SG	122.0	7.9	91	133.5
96	5/10/2012	Per Plan Pond B	SG	115.4	5.1	91	126.5
97	5/10/2012	Per Plan Pond B	SG	116.7	7.6	92	126.5
98	5/10/2012	Per Plan Pond B	SG	119.3	4.3	92	130.0
99	5/10/2012	Per Plan Pond B	SG	117.5	7.2	90	130.0
100	5/10/2012	Per Plan Pond B	SG	121.7	5.7	91	133.5
101	5/10/2012	Per Plan Pond B	SG	119.5	6.3	92	130.0
102	5/10/2012	Per Plan Pond B	SG	124.6	5.2	93	133.5
103	5/10/2012	Per Plan Pond B	SG	114.5	3.7	91	126.5
NG = Natural Grade SG = Subgrade BOP = Bottom of Pond							
Tuesday, May 15, 2012				Sladden Engineering			

# Test Results

Project Name: Hawes Composting Facility - Phase 1				Project No.: 622-12006			
Location: Hinkley/Kramer Junction, San Bernardino County, Ca.				Report No.: 12-06-024			
Test No.	Date Tested	Location	Elevation	Dry Density In place	% Moisture in Place	Relative Compaction	Maximum Density
104	5/25/2012	Per Plan West Side	SG	118.7	6.5	90	131.5
105	5/25/2012	Per Plan West Side	SG	119.1	6.6	91	131.5
106	5/25/2012	Per Plan West Side	SG	116.2	9.3	92	126.5
107	5/25/2012	Per Plan West Side	SG	122.2	6.1	91	134.0
108	5/25/2012	Per Plan West Side	SG	120.8	6.2	90	134.0
109	5/25/2012	Per Plan West Side	SG	115.0	9.0	91	126.5
110	5/25/2012	Per Plan West Side	SG	123.0	6.1	92	134.0
111	5/25/2012	Per Plan West Side	SG	120.9	6.2	90	134.0
112	5/25/2012	Per Plan West Side	SG	117.8	9.1	93	126.5
SG= Subgrade							
Wednesday, June 06, 2012				Sladden Engineering			



LOCATION PLAN

• APPROX. LOCATION DENSITY TESTS

**— Limits of COMPOST AREA**

# Appendix B

## Geosynthetic Manufacturer's Quality Assurance GCL and HDPE Liner

# SUBMITTAL CONTROL FORM



DATE: APRIL 27, 2011  
JOB NO: 103004  
SUBMITTAL No: 5  
PROJECT: NURSERY PRODUCTS HAWES  
COMPOSTING FACILITY

TO: Nursery Products  
ATTN: Chris Seney P. E.  
12277 Apple Valley Rd, Ste. 131  
Apple Valley, CA 92308  
PHONE: 760-272-1098  
FAX:  
EMAIL: nurseryproducts@charter.net

FROM: EC Applications, Inc. (ECA)  
Chris Fore  
415 W. Taft Ave, Suite H  
Orange, CA 92865  
PHONE: (714) 921-9848 x 104  
cfore@ecapplications.com

### WE ARE SUBMITTING THE ENCLOSED:

- SHOP DRAWINGS                       CERTIFICATES OF COMPLIANCE                       SAMPLES  
 MATERIAL DATA                       QC INFORMATION                       OTHER

### THESE ARE TRANSMITTED FOR:

- APPROVAL                       INFORMATION                       RESUBMIT  
 AS REQUESTED                       FOR REVIEW                      PREV SUB NO:

ITEM NO.	DESCRIPTION OF ITEM	NO. OF COPIES	CONTRACT REFERENCE/SPEC SECTION OR DRAWING SHEET NO.
1	Geomembrane Manufacturers Quality Control Certifications	1	Design Plan April, 2010

### NOTE:

THE ABOVE SUBMITTED ITEMS HAVE BEEN REVIEWED IN DETAIL AND ARE CORRECT AND IN GENERAL CONFORMANCE WITH THE CONTRACT DRAWINGS AND SPECIFICATIONS EXCEPT AS OTHERWISE STATED.

Chris Fore

EC Applications, Inc. AUTHORIZED SIGNATURE

IF THE ABOVE VARIANCES ARE ACCEPTABLE, PLEASE CONFIRM IN WRITING WITHIN TEN (10) DAYS, OTHERWISE WE WILL PROCEED PER THE PROPOSED VARIANCES



### Certificate of Analysis

Shipped To: AGRU AMERICA INC 2000 EAST NEWLANDS FERNLEY NV 89408 USA	CPC Delivery #: 88203328 PO #: 005824 Weight: 196200 LB Ship Date: 01/27/2011 Package: BULK Mode: Hopper Car Car #: PSPX002048 Seal No: 267514
Recipient: PALMER Fax:	

Product:  
MARLEX POLYETHYLENE K307 BULK

Lot Number: 7110029

Property	Test Method	Value	Unit
Melt Index	ASTM D1238	0.24	g/10mi
HLMI Flow Rate	ASTM D1238	21	g/10mi
ensity	D1505 or D4883	0.937	g/cm3
Pellet Count	P02.08.03	27	pel/g
Production Date		01/06/2011	

The data set forth herein have been carefully compiled by Chevron Phillips Chemical Company LP. However, there is no warranty of any kind, either expressed or implied, applicable to its use, and the user assumes all risk and liability in connection therewith.

Troy Griffin  
Quality Systems Coordinator

For CoA questions contact Customer Service Representative at +1-832-813-4782

## Certificate of Analysis

Shipped To: AGRU AMERICA INC  
2000 EAST NEWLANDS  
FERNLEY NV 89408  
USA

CPC Delivery #: 88215793  
PO #: 005832  
Weight: 48,000 LB (est.)  
Ship Date: 02/24/2011  
Package: BULK  
Mode: Hopper Truck

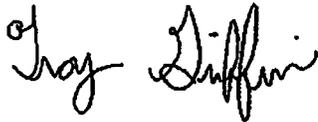
Recipient: PALMER  
Fax:

Product:  
MARLEX POLYETHYLENE K307 BULK

Lot Number: 8110197

Property	Test Method	Value	Unit
Melt Index	ASTM D1238	0.27	g/10mi
HLMI Flow Rate	ASTM D1238	22	g/10mi
Density	D1505 or D4883	0.938	g/cm3
Pellet Count	P02.08.03	27	pel/g
Production Date		02/17/2011	

The data set forth herein have been carefully compiled by Chevron Phillips Chemical Company LP. However, there is no warranty of any kind, either expressed or implied, applicable to its use, and the user assumes all risk and liability in connection therewith.



Troy Griffin  
Quality Systems Coordinator

For CoA questions contact Customer Service Representative at 800-231-1212



# quality certificate

ROLL # **906313-11**

Lot # **7110029**

Liner Type: **SMOOTH HDPE**

Thickness Measurement ASTM D5199 (Modified)	MIN:	METRIC	ENGLISH	Thickness	1.5mm	60mil		
		1.472 mm	58 mil	Length	164.594 m	540 feet	Width	7.00 m
	MAX:	1.647 mm	65 mil					
	AVE:	1.556 mm	61 mil					OIT(Standard) ASTM D3895 minutes 174
Specific Gravity ASTM D792	Density			g/cc			.941	
MFI ASTM D1238 COND. E GRADE:	K307	Melt Flow Index 190°C /2160 g - g /10 min						.24
Carbon Black Content ASTM D4218	Range			%			2.12	
Carbon Black Dispersion ASTM D5596	Category							10 IN CAT 1
Tensile Strength ASTM D6693 ( 2 inches / minute )	Average Strength @ Yield	26 N/mm	149 ppi					2,478 psi
	Average Strength @ Break	50 N/mm	287 ppi					4,780 psi
Tensile Elongation ASTM D6693 ( 2 inches / minute ) Lo = 1.3" Yield Lo = 2.0" Break	Average Elongation @ Yield			%			15.93	
	Average Elongation @ Break			%			822.0	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional Change			%			-0.31	
Tear Resistance ASTM D1004 (Modified)	Average Tear Resistance	203 N					45.729 lbs	
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	378 N					84.932 lbs	
Puncture Resistance ASTM D4833 (Modified)	Load	550 N					123.61 lbs	
ESCR ASTM D1693	Minimum Hrs w / o Failures	1500 hrs					CERTIFIED	
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs					pass	

Customer: **Erosion Control**  
 PO: **8385 Hawes Composting Fac.**  
 Destination **Barstow, CA**

Date: **2/11/11**  
 Signature: *[Handwritten Signature]*  
 Manager, Quality Control Department  
 GOHDSM.FRM  
 REV 06  
 12/23/05



# quality certificate

ROLL # **906314-11**

Lot # **7110029**

Liner Type: **SMOOTH HDPE**

Thickness Measurement ASTM D5199 (Modified)	MIN:	METRIC	ENGLISH	Thickness	1.5mm	60mil	Length	164.594	m	540	feet
					1.466 mm	58 mil					
	MAX:	1.637 mm	64 mil				Width	7.00	m	23.0	feet
	AVE:	1.544 mm	61 mil				OIT(Standard) ASTM D3895			minutes	174

Specific Gravity ASTM D792      Density      g/cc      .941

MFI ASTM D1238  
COND. E      Melt Flow Index 190°C /2160 g - g /10 min      .24  
GRADE: **K307**

Carbon Black Content ASTM D4218      Range      %      2.12

Carbon Black Dispersion ASTM D5596      Category      10 IN CAT 1

Tensile Strength ASTM D6693  
( 2 inches / minute )      Average Strength @ Yield      26 N/mm      149 ppi      2,478 psi

Average Strength @ Break      50 N/mm      287 ppi      4,780 psi

Tensile Elongation ASTM D6693  
( 2 inches / minute )      Average Elongation @ Yield      %      15.93  
Lo = 1.3" Yield      Average Elongation @ Break      %      822.0  
Lo = 2.0" Break

Dimensional Stability ASTM D1204 (Modified)      Average Dimensional Change      %      -0.31

Tear Resistance ASTM D1004 (Modified)      Average Tear Resistance      203 N      45.729 lbs

Puncture Resistance FTMS 101 Method 2065 (Modified)      Load      378 N      84.932 lbs

Puncture Resistance ASTM D4833 (Modified)      Load      550 N      123.61 lbs

ESCR ASTM D1693      Minimum Hrs w / o Failures      1500 hrs      CERTIFIED

Notched Constant Tensile Load ASTM D5397      pass / fail @ 30%      300 hrs      pass

Customer: **Erosion Control**  
PO: **8385 Hawes Composting Fac.**  
Destination **Barstow, CA**

Date: **2/11/11**  
Signature: *[Handwritten Signature]*  
Manager, Quality Control Department  
60HDSM.FRM  
REV 06  
12/23/05



# quality certificate

ROLL # **906315-11**

Lot # **7110029**

Liner Type: **SMOOTH HDPE**

Thickness Measurement ASTM D5199 (Modified)	MIN:	METRIC	ENGLISH	Thickness	1.5mm	60mil		
				1.451 mm	57 mil	Length	164.594	m
	MAX:	1.64 mm	65 mil	Width	7.00	m	23.0	feet
	AVE:	1.539 mm	61 mil	OIT(Standard) ASTM D3895		minutes	174	

Specific Gravity  
ASTM D792      Density      g/cc      .941

MFI ASTM D1238  
COND. E      Melt Flow Index 190°C /2160 g - g /10 min      .24  
GRADE:      K307

Carbon Black Content  
ASTM D4218      Range      %      2.12

Carbon Black Dispersion  
ASTM D5596      Category      10 IN CAT 1

Tensile Strength  
ASTM D6693  
( 2 inches / minute )      Average Strength @ Yield      26 N/mm      149 ppi      2,478 psi

Average Strength @ Break      50 N/mm      287 ppi      4,780 psi

Tensile Elongation  
ASTM D6693  
( 2 inches / minute )      Average Elongation @ Yield      %      15.93

Lo = 1.3" Yield      Average Elongation @ Break      %      822.0  
Lo = 2.0" Break

Dimensional Stability  
ASTM D1204 (Modified)      Average Dimensional Change      %      -0.31

Tear Resistance  
ASTM D1004 (Modified)      Average Tear Resistance      203 N      45.729 lbs

Puncture Resistance  
FTMS 101 Method 2065 (Modified)      Load      378 N      84.932 lbs

Puncture Resistance  
ASTM D4833 (Modified)      Load      550 N      123.61 lbs

ESCR  
ASTM D1693      Minimum Hrs w / o Failures      1500 hrs      CERTIFIED

Notched Constant Tensile Load  
ASTM D5397      pass / fail @ 30%      300 hrs      pass

Customer: **Erosion Control**  
PO: **8385 Hawes Composting Fac.**  
Destination **Barstow, CA**

Date: **2/11/11**  
Signature: *[Signature]*  
Manager, Quality Control Department  
60HDSM.FRM  
RCV 06  
12/23/05



# quality certificate

ROLL # **906316-11**

Lot # **7110029**

Liner Type: **SMOOTH HDPE**

Thickness Measurement ASTM D5199 (Modified)	MIN:	METRIC	ENGLISH	Thickness	1.5mm	60mil	Length	164.594	m	540	feet
		mm	mil		Width	7.00		m	23.0	feet	
	MAX:	1.629	64								
	AVE:	1.544	61								
				OIT(Standard) ASTM D3895	minutes					174	

Specific Gravity ASTM D792      Density      g/cc      **.941**

MFI ASTM D1238  
COND. E  
GRADE: **K307**      Melt Flow Index 190°C /2160 g - g /10 min      **.24**

Carbon Black Content ASTM D4218      Range      %      **2.05**

Carbon Black Dispersion ASTM D5596      Category      **10 IN CAT 1**

Tensile Strength ASTM D6693  
( 2 inches / minute )      Average Strength @ Yield      **26 N/mm      149 ppi      2,478 psi**

Average Strength @ Break      **50 N/mm      287 ppi      4,780 psi**

Tensile Elongation ASTM D6693  
( 2 inches / minute )      Average Elongation @ Yield      %      **15.93**

Lo = 1.3" Yield      Average Elongation @ Break      %      **822.0**  
Lo = 2.0" Break

Dimensional Stability ASTM D1204 (Modified)      Average Dimensional Change      %      **-0.31**

Tear Resistance ASTM D1004 (Modified)      Average Tear Resistance      **203 N      45.729 lbs**

Puncture Resistance FTMS 101 Method 2065 (Modified)      Load      **378 N      84.932 lbs**

Puncture Resistance ASTM D4833 (Modified)      Load      **550 N      123.61 lbs**

ESCR ASTM D1693      Minimum Hrs w / o Failures      **1500 hrs      CERTIFIED**

Notched Constant Tensile Load ASTM D5397      pass / fail @ 30%      **300 hrs      pass**

Customer: **Erosion Control**  
PO: **8385 Hawes Composting Fac.**  
Destination **Barstow, CA**

Date: **2/11/11**

Signature: *[Signature]*  
Manager, Quality Control Department

60HDSM.FRM  
REV 06  
12/23/05





# quality certificate

ROLL # **906318-11**

Lot # **7110029**

Liner Type: **SMOOTH HDPE**

Thickness Measurement ASTM D5199 (Modified)	MIN:	METRIC	ENGLISH	Thickness Length Width	1.5mm	60mil	feet
		MAX:	1.496 mm		59 mil	164.594 m	
AVE:	1.623 mm	64 mil	7.00 m	23.0	feet		
				OIT(Standard) ASTM D3895	minutes	174	

Specific Gravity ASTM D792	Density	g/cc	.941
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MFI ASTM D1238 COND. E GRADE:	K307	Melt Flow Index 190°C /2160 g - g /10 min	.24
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Carbon Black Content ASTM D4218	Range	%	2.06
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Carbon Black Dispersion ASTM D5596	Category	10 IN CAT 1	
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Tensile Strength ASTM D6693 ( 2 inches / minute )	Average Strength @ Yield	23 N/mm	134 ppi	2,236 psi
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Average Strength @ Break	49 N/mm	281 ppi	4,684 psi
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Tensile Elongation ASTM D6693 ( 2 inches / minute ) Lo = 1.3" Yield Lo = 2.0" Break	Average Elongation @ Yield	%	14.63
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Average Elongation @ Break	%	847.7
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Dimensional Stability ASTM D1204 (Modified)	Average Dimensional Change	%	-0.31
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Tear Resistance ASTM D1004 (Modified)	Average Tear Resistance	203 N	45.729 lbs
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Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	378 N	84.932 lbs
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Puncture Resistance ASTM D4833 (Modified)	Load	550 N	123.61 lbs
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ESCR ASTM D1693	Minimum Hrs w / o Failures	1500 hrs	CERTIFIED
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Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs	pass
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Customer: **Erosion Control**  
 PO: **8385 Hawes Composting Fac.**  
 Destination **Barstow, CA**

Date: **2/11/11**

Signature:   
 Manager, Quality Control Department

60HDSM.FRM  
REV 06  
12/23/05



# quality certificate

ROLL # **908466-11**

Lot # **8110197**

Liner Type: **SMOOTH HDPE**

Thickness Measurement ASTM D5199 (Modified)		METRIC	ENGLISH	Thickness	1.5mm	60mil		
	MIN:	1.52 mm	60 mil	Length	164.594 m	540	feet	
	MAX:	1.593 mm	63 mil	Width	7.00 m	23.0	feet	
	AVE:	1.542 mm	61 mil	OIT(Standard)	ASTM D3895	minutes	216	

Specific Gravity ASTM D792	Density	g/cc	.945
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MFI ASTM D1238 COND. E GRADE:	K307	Melt Flow Index 190°C /2160 g - g /10 min	.23
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Carbon Black Content ASTM D4218	Range	%	2.26
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Carbon Black Dispersion ASTM D5596	Category	10 IN CAT 1
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Tensile Strength ASTM D6693 ( 2 inches / minute )	Average Strength @ Yield	26 N/mm	149 ppi	2,485 psi
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Average Strength @ Break	50 N/mm	287 ppi	4,789 psi
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Tensile Elongation ASTM D6693 ( 2 inches / minute ) Lo = 1.3" Yield Lo = 2.0" Break	Average Elongation @ Yield	%	17.13
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Average Elongation @ Break	%	875.9
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Dimensional Stability ASTM D1204 (Modified)	Average Dimensional Change	%	-0.28
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Tear Resistance ASTM D1004 (Modified)	Average Tear Resistance	223 N	50.104 lbs
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Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	398 N	89.532 lbs
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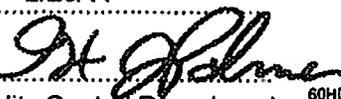
Puncture Resistance ASTM D4833 (Modified)	Load	557 N	125.20 lbs
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ESCR ASTM D1693	Minimum Hrs w / o Failures	1500 hrs	CERTIFIED
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Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs	ONGOING
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Customer: **Erosion Control**  
 PO: **8385 Hawes Composting Fac.**  
 Destination **Barstow, CA**

Date: **2/25/11**

Signature:   
 Manager, Quality Control Department



# quality certificate

ROLL # **908467-11**

Lot # **8110197**

Liner Type: **SMOOTH HDPE**

Thickness Measurement ASTM D5199 (Modified)	METRIC	ENGLISH	Thickness	1.5mm	60mil		
MIN:	1.499 mm	59 mil	Length	164.594 m	540	feet	
MAX:	1.597 mm	63 mil	Width	7.00 m	23.0	feet	
AVE:	1.544 mm	61 mil	OIT(Standard) ASTM D3895	minutes	216		
Specific Gravity ASTM D792	Density		g/cc		.945		
MFI ASTM D1238 COND. E GRADE:	K307	Melt Flow Index 190°C /2160 g - g /10 min			.23		
Carbon Black Content ASTM D4218	Range		%		2.26		
Carbon Black Dispersion ASTM D5596	Category				10 IN CAT 1		
Tensile Strength ASTM D6693 ( 2 inches / minute )	Average Strength @ Yield	26 N/mm	149 ppi	2,485 psi			
	Average Strength @ Break	50 N/mm	287 ppi	4,789 psi			
Tensile Elongation ASTM D6693 ( 2 inches / minute ) Lo = 1.3" Yield Lo = 2.0" Break	Average Elongation @ Yield	%		17.13			
	Average Elongation @ Break	%		875.9			
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional Change	%		-0.28			
Tear Resistance ASTM D1004 (Modified)	Average Tear Resistance	223 N		50,104 lbs			
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	398 N		89,532 lbs			
Puncture Resistance ASTM D4833 (Modified)	Load	557 N		125.20 lbs			
ESCR ASTM D1693	Minimum Hrs w / o Failures	1500 hrs		CERTIFIED			
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs		ONGOING			

Customer: **Erosion Control**  
PO: **8385 Hawes Composting Fac.**  
Destination **Barstow, CA**

Date: **2/25/11**

Signature: *[Handwritten Signature]*  
Manager, Quality Control Department

60HDSM.FRM  
REV 06  
12/23/05



# quality certificate

ROLL # **908468-11**

Lot # **8110197**

Liner Type: **SMOOTH HDPE**

Thickness Measurement ASTM D5199 (Modified)		METRIC	ENGLISH	Thickness	1.5mm	60mil		
	MIN:	1.489 mm	59 mil	Length	164.594 m	540 feet		
	MAX:	1.577 mm	62 mil	Width	7.00 m	23.0 feet		
	AVE:	1.54 mm	61 mil	OIT(Standard) ASTM D3895	minutes	216		

Specific Gravity ASTM D792	Density	g/cc	.945
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MFI ASTM D1238 COND. E GRADE:	K307	Melt Flow Index 190°C /2160 g - g /10 min	.23
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Carbon Black Content ASTM D4218	Range	%	2.17
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Carbon Black Dispersion ASTM D5596	Category	10 IN CAT 1
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Tensile Strength ASTM D6693 ( 2 inches / minute )	Average Strength @ Yield	26 N/mm	149 ppi	2,485 psi
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Average Strength @ Break	50 N/mm	287 ppi	4,789 psi
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Tensile Elongation ASTM D6693 ( 2 inches / minute ) Lo = 1.3" Yield Lo = 2.0" Break	Average Elongation @ Yield	%	17.13
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Average Elongation @ Break	%	875.9
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Dimensional Stability ASTM D1204 (Modified)	Average Dimensional Change	%	-0.28
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Tear Resistance ASTM D1004 (Modified)	Average Tear Resistance	223 N	50.104 lbs
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Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	398 N	89.532 lbs
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Puncture Resistance ASTM D4833 (Modified)	Load	557 N	125.20 lbs
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ESCR ASTM D1693	Minimum Hrs w / o Failures	1500 hrs	CERTIFIED
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Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300 hrs	ONGOING
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Customer: **Erosion Control**  
 PO: **8385 Hawes Composting Fac.**  
 Destination **Barstow, CA**

Date: **2/25/11**  
 Signature: *[Signature]*  
 Manager, Quality Control Department  
 60HDSM FRM  
 REV 08  
 12/23/05



# quality certificate

ROLL # **908469-11**

Lot # **8110197**

Liner Type: **SMOOTH HDPE**

Thickness Measurement ASTM D5199 (Modified)	MIN:	METRIC	ENGLISH	Thickness	1.5mm	60mil		
		mm	mil	Length	164.594	m	540	feet
		1.509	59	Width	7.00	m	23.0	feet
	MAX:	1.562	61	OIT(Standard) ASTM D3895		minutes	216	
	AVE:	1.544	61					
Specific Gravity ASTM D792	Density			g/cc			.945	
MFI ASTM D1238 COND. E GRADE:	K307	Melt Flow Index 190°C /2160 g - g /10 min					.23	
Carbon Black Content ASTM D4218	Range			%			2.17	
Carbon Black Dispersion ASTM D5596	Category						10 IN CAT 1	
Tensile Strength ASTM D6693 ( 2 inches / minute )	Average Strength @ Yield	26	N/mm	149	ppi	2,485	psi	
	Average Strength @ Break	50	N/mm	287	ppi	4,789	psi	
Tensile Elongation ASTM D6693 ( 2 inches / minute ) Lo = 1.3" Yield Lo = 2.0" Break	Average Elongation @ Yield			%			17.13	
	Average Elongation @ Break			%			875.9	
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional Change			%			-0.28	
Tear Resistance ASTM D1004 (Modified)	Average Tear Resistance	223	N	50.104	lbs			
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	398	N	89.532	lbs			
Puncture Resistance ASTM D4833 (Modified)	Load	557	N	125.20	lbs			
ESCR ASTM D1693	Minimum Hrs w / o Failures	1500	hrs			CERTIFIED		
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300	hrs			ONGOING		

Customer: **Erosion Control**  
 PO: **8385 Hawes Composting Fac.**  
 Destination **Barstow, CA**

Date: **2/25/11**

Signature: *[Signature]*  
 Manager, Quality Control Department



# quality certificate

ROLL # **908470-11**

Lot # **8110197**

Liner Type: **SMOOTH HDPE**

Thickness Measurement ASTM D5199 (Modified)		METRIC	ENGLISH	Thickness	1.5mm	60mil		
	MIN:	1.506 mm	59 mil	Length	164.594 m	540	feet	
	MAX:	1.584 mm	62 mil	Width	7.00 m	23.0	feet	
	AVE:	1.542 mm	61 mil	OIT(Standard) ASTM D3895	minutes	216		

Specific Gravity ASTM D792      Density      g/cc      .945

MFI ASTM D1238  
COND. E  
GRADE: **K307**      Melt Flow Index 190°C /2160 g - g /10 min      .23

Carbon Black Content ASTM D4218      Range      %      2.11

Carbon Black Dispersion ASTM D5596      Category      10 IN CAT 1

Tensile Strength ASTM D6693  
( 2 inches / minute )      Average Strength @ Yield      26 N/mm      148 ppi      2,473 psi

Average Strength @ Break      47 N/mm      270 ppi      4,506 psi

Tensile Elongation ASTM D6693  
( 2 inches / minute )  
Lo = 1.3" Yield      Average Elongation @ Yield      %      15.44  
Lo = 2.0" Break      Average Elongation @ Break      %      837.8

Dimensional Stability ASTM D1204 (Modified)      Average Dimensional Change      %      -0.28

Tear Resistance ASTM D1004 (Modified)      Average Tear Resistance      223 N      50,104 lbs

Puncture Resistance FTMS 101 Method 2065 (Modified)      Load      398 N      89.532 lbs

Puncture Resistance ASTM D4833 (Modified)      Load      557 N      125.20 lbs

ESCR ASTM D1693      Minimum Hrs w / o Failures      1500 hrs      CERTIFIED

Notched Constant Tensile Load ASTM D5397      pass / fail @ 30%      300 hrs      ONGOING

Customer: **Erosion Control**  
PO: **8385 Hawes Composting Fac.**  
Destination **Barstow, CA**

Date: **2/25/11**

Signature: *[Handwritten Signature]*  
Manager, Quality Control Department

80HDSM.FRM  
REV 00  
12/23/06





# quality certificate

ROLL # **908572-11** Lot # **8110197** Liner Type: **SMOOTH HDPE**

Thickness Measurement ASTM D5199 (Modified)		METRIC	ENGLISH	Thickness	1.5mm	60mil		
	MIN:	1.501 mm	59 mil	Length	164.594 m	540	feet	
	MAX:	1.571 mm	62 mil	Width	7.00 m	23.0	feet	
	AVE:	1.546 mm	61 mil	OIT(Standard)	ASTM D3895	minutes	216	

Specific Gravity  
ASTM D792 Density g/cc .945

MFI ASTM D1238  
COND. E  
GRADE: **K307** Melt Flow Index 190°C /2160 g - g /10 min .23

Carbon Black Content  
ASTM D4218 Range % 2.24

Carbon Black Dispersion  
ASTM D5596 Category 10 IN CAT 1

Tensile Strength  
ASTM D6693  
( 2 inches / minute ) Average Strength @ Yield 26 N/mm 148 ppi 2,473 psi

Average Strength @ Break 47 N/mm 270 ppi 4,506 psi

Tensile Elongation  
ASTM D6693  
( 2 inches / minute ) Average Elongation @ Yield % 15.44

Lo = 1.3" Yield  
Lo = 2.0" Break Average Elongation @ Break % 837.8

Dimensional Stability  
ASTM D1204 (Modified) Average Dimensional Change % -0.28

Tear Resistance  
ASTM D1004 (Modified) Average Tear Resistance 223 N 50.104 lbs

Puncture Resistance  
FTMS 101 Method 2065 (Modified) Load 398 N 89.532 lbs

Puncture Resistance  
ASTM D4833 (Modified) Load 557 N 125.20 lbs

ESCR  
ASTM D1693 Minimum Hrs w / o Failures 1500 hrs CERTIFIED

Notched Constant Tensile Load  
ASTM D5397 pass / fail @ 30% 300 hrs ONGOING

Customer: **Erosion Control**  
PO: **8385 Hawes Composting Fac.**  
Destination **Barstow, CA**

Date: **2/25/11**  
Signature: *[Signature]*  
Manager, Quality Control Department  
60HDSM.FRM  
REV 06  
12/23/05





# quality certificate

ROLL # **908574-11**

Lot # **8110197**

Liner Type: **SMOOTH HDPE**

Thickness Measurement ASTM D5199 (Modified)		METRIC	ENGLISH	Thickness	1.5mm	60mil		
	MIN:	1.521 mm	60 mil	Length	164.594 m	540	feet	
	MAX:	1.573 mm	62 mil	Width	7.00 m	23.0	feet	
	AVE:	1.545 mm	61 mil	OIT(Standard)	ASTM D3895	minutes		216

Specific Gravity ASTM D792      Density      g/cc      .945

MFI ASTM D1238  
COND. E      Melt Flow Index 190°C /2160 g - g /10 min      .23  
GRADE:      **K307**

Carbon Black Content ASTM D4218      Range      %      2.24

Carbon Black Dispersion ASTM D5596      Category      10 IN CAT 1

Tensile Strength ASTM D6693  
( 2 inches / minute )      Average Strength @ Yield      26 N/mm      148 ppi      2,473 psi

Average Strength @ Break      47 N/mm      270 ppi      4,506 psi

Tensile Elongation ASTM D6693  
( 2 inches / minute )      Average Elongation @ Yield      %      15.44  
Lo = 1.3" Yield      Average Elongation @ Break      %      837.8  
Lo = 2.0" Break

Dimensional Stability ASTM D1204 (Modified)      Average Dimensional Change      %      -0.28

Tear Resistance ASTM D1004 (Modified)      Average Tear Resistance      223 N      50.104 lbs

Puncture Resistance FTMS 101 Method 2065 (Modified)      Load      398 N      89.532 lbs

Puncture Resistance ASTM D4833 (Modified)      Load      557 N      125.20 lbs

ESCR ASTM D1693      Minimum Hrs w / o Failures      1500 hrs      **CERTIFIED**

Notched Constant Tensile Load ASTM D5397      pass / fail @ 30%      300 hrs      **ONGOING**

Customer: **Erosion Control**  
PO: **8385 Hawes Composting Fac.**  
Destination **Barstow, CA**

Date:..... **2/25/11**

Signature..... *[Signature]*  
Manager, Quality Control Department

60HDSM.FRM  
REV 06  
12/23/05



# quality certificate

ROLL # **908575-11**

Lot # **8110197**

Liner Type: **SMOOTH HDPE**

Thickness Measurement ASTM D5199 (Modified)		METRIC	ENGLISH	Thickness	1.5mm	60mil		
	MIN:	1.491 mm	59 mil	Length	164.594 m	540	feet	
	MAX:	1.584 mm	62 mil	Width	7.00 m	23.0	feet	
	AVE:	1.539 mm	61 mil	OIT(Standard) ASTM D3895	minutes	216		

Specific Gravity ASTM D792 Density g/cc **.945**

MFI ASTM D1238 COND. E GRADE: **K307** Melt Flow Index 190°C /2160 g - g /10 min **.23**

Carbon Black Content ASTM D4218 Range % **2.23**

Carbon Black Dispersion ASTM D5596 Category **10 IN CAT 1**

Tensile Strength ASTM D6693 ( 2 inches / minute ) Average Strength @ Yield **26 N/mm 148 ppi 2,465 psi**

Average Strength @ Break **48 N/mm 272 ppi 4,537 psi**

Tensile Elongation ASTM D6693 ( 2 inches / minute ) Average Elongation @ Yield **% 16.33**

Lo = 1.3" Yield Average Elongation @ Break **% 829.7**

Dimensional Stability ASTM D1204 (Modified) Average Dimensional Change **% -0.28**

Tear Resistance ASTM D1004 (Modified) Average Tear Resistance **222 N 49.996 lbs**

Puncture Resistance FTMS 101 Method 2065 (Modified) Load **402 N 90.416 lbs**

Puncture Resistance ASTM D4833 (Modified) Load **549 N 123.53 lbs**

ESCR ASTM D1693 Minimum Hrs w / o Failures **1500 hrs CERTIFIED**

Notched Constant Tensile Load ASTM D5397 pass / fail @ 30% **300 hrs ONGOING**

Customer: **Erosion Control**  
 PO: **8385 Hawes Composting Fac.**  
 Destination **Barstow, CA**

Date: **2/25/11**

Signature: *[Handwritten Signature]*  
 Manager, Quality Control Department

60HDSM.FRM  
 REV 08  
 12/23/05



# quality certificate

ROLL # **908576-11** Lot # **8110197** Liner Type: **SMOOTH HDPE**

Thickness Measurement ASTM D5199 (Modified)	MIN:	METRIC	ENGLISH	Thickness	1.5mm	60mil	Length	164.594	m	540	feet	Width	7.00	m	23.0	feet
		MAX:	1.58 mm		62 mil	OIT(Standard) ASTM D3895		minutes	216							
Specific Gravity ASTM D792		Density		g/cc		.945										
MFI ASTM D1238 COND. E GRADE:		Melt Flow Index 190°C /2160 g - g /10 min				.23										
Carbon Black Content ASTM D4218		Range		%		2.23										
Carbon Black Dispersion ASTM D5596		Category				10 IN CAT 1										
Tensile Strength ASTM D6693 ( 2 inches / minute )		Average Strength @ Yield		26 N/mm		148 ppi		2,465 psi								
		Average Strength @ Break		48 N/mm		272 ppi		4,537 psi								
Tensile Elongation ASTM D6693 ( 2 inches / minute ) Lo = 1.3" Yield Lo = 2.0" Break		Average Elongation @ Yield		%		16.33										
		Average Elongation @ Break		%		829.7										
Dimensional Stability ASTM D1204 (Modified)		Average Dimensional Change		%		-0.28										
Tear Resistance ASTM D1004 (Modified)		Average Tear Resistance		222 N		49.996 lbs										
Puncture Resistance FTMS 101 Method 2065 (Modified)		Load		402 N		90.416 lbs										
Puncture Resistance ASTM D4833 (Modified)		Load		549 N		123.53 lbs										
ESCR ASTM D1693		Minimum Hrs w / o Failures		1500 hrs		CERTIFIED										
Notched Constant Tensile Load ASTM D5397		pass / fail @ 30%		300 hrs		ONGOING										

Customer: **Erosion Control**  
 PO: **8385 Hawes Composting Fac.**  
 Destination **Barstow, CA**

Date: **2/25/11**  
 Signature: *[Handwritten Signature]*  
 Manager, Quality Control Department  
 BOHDSM.FRM  
 REV 06  
 12/23/05



# quality certificate

ROLL # **908577-11** Lot # **8110197** Liner Type: **SMOOTH HDPE**

Thickness Measurement ASTM D5199 (Modified)		METRIC	ENGLISH	Thickness	1.5mm	60mil		
	MIN:	1.509 mm	59 mil	Length	164.594 m	540 feet		
	MAX:	1.56 mm	61 mil	Width	7.00 m	23.0 feet		
	AVE:	1.545 mm	61 mil	OIT(Standard) ASTM D3895	minutes	216		

Specific Gravity ASTM D792 Density g/cc **.945**

MFI ASTM D1238 COND. E GRADE: **K307** Melt Flow Index 190°C /2160 g - g /10 min **.23**

Carbon Black Content ASTM D4218 Range % **2.23**

Carbon Black Dispersion ASTM D5596 Category **10 IN CAT 1**

Tensile Strength ASTM D6693 ( 2 inches / minute ) Average Strength @ Yield **26 N/mm 148 ppi 2,465 psi**

Average Strength @ Break **48 N/mm 272 ppi 4,537 psi**

Tensile Elongation ASTM D6693 ( 2 inches / minute ) Average Elongation @ Yield **16.33**

Lo = 1.3" Yield Average Elongation @ Break **829.7**

Dimensional Stability ASTM D1204 (Modified) Average Dimensional Change **-0.28**

Tear Resistance ASTM D1004 (Modified) Average Tear Resistance **222 N 49.996 lbs**

Puncture Resistance FTMS 101 Method 2065 (Modified) Load **402 N 90.416 lbs**

Puncture Resistance ASTM D4833 (Modified) Load **549 N 123.53 lbs**

ESCR ASTM D1693 Minimum Hrs w / o Failures 1500 hrs **CERTIFIED**

Notched Constant Tensile Load ASTM D5397 pass / fail @ 30% 300 hrs **ONGOING**

Customer: **Erosion Control**  
 PO: **8385 Hawes Composting Fac.**  
 Destination **Barstow, CA**

Date: **2/25/11**

Signature: *[Handwritten Signature]*  
 Manager, Quality Control Department



# quality certificate

ROLL # **908578-11** Lot # **8110197** Liner Type: **SMOOTH HDPE**

Thickness Measurement ASTM D5199 (Modified)	MIN:	METRIC	ENGLISH	Thickness	1.5mm	60mil	Length	164.594	m	540	feet	Width	7.00	m	23.0	feet
		MAX:	1.566 mm		62 mil	OIT(Standard) ASTM D3895		minutes	216							
	AVE:	1.546 mm	61 mil													

Specific Gravity ASTM D792 Density g/cc .945

MFI ASTM D1238 COND. E GRADE: **K307** Melt Flow Index 190°C /2160 g - g /10 min .23

Carbon Black Content ASTM D4218 Range % 2.14

Carbon Black Dispersion ASTM D5596 Category 10 IN CAT 1

Tensile Strength ASTM D6693 ( 2 inches / minute ) Average Strength @ Yield 26 N/mm 148 ppi 2,465 psi

Average Strength @ Break 48 N/mm 272 ppi 4,537 psi

Tensile Elongation ASTM D6693 ( 2 inches / minute ) Average Elongation @ Yield % 16.33

Lo = 1.3" Yield Average Elongation @ Break % 829.7

Dimensional Stability ASTM D1204 (Modified) Average Dimensional Change % -0.28

Tear Resistance ASTM D1004 (Modified) Average Tear Resistance 222 N 49.996 lbs

Puncture Resistance FTMS 101 Method 2065 (Modified) Load 402 N 90.416 lbs

Puncture Resistance ASTM D4833 (Modified) Load 549 N 123.53 lbs

ESCR ASTM D1693 Minimum Hrs w / o Failures 1500 hrs **CERTIFIED**

Notched Constant Tensile Load ASTM D5397 pass / fail @ 30% 300 hrs **ONGOING**

Customer: **Erosion Control**  
 PO: **8385 Hawes Composting Fac.**  
 Destination **Barstow, CA**

Date: **2/25/11**  
 Signature: *[Signature]*  
 Manager, Quality Control Department  
 60HDSM.FRM  
 REV 06  
 12/23/05



# quality certificate

ROLL # **908579-11**

Lot # **8110197**

Liner Type: **SMOOTH HDPE**

Thickness Measurement ASTM D5199 (Modified)	MIN:	METRIC	ENGLISH	Thickness Length	1.5mm	60mil	feet
		mm	mil		m	540	
		1.506	59	Width	7.00	m	23.0 feet
	MAX:	1.592	63				
	AVE:	1.554	61	OIT(Standard) ASTM D3895	minutes		216
Specific Gravity ASTM D792	Density			g/cc			.945
MFI ASTM D1238 COND. E GRADE:	K307	Melt Flow Index 190°C /2160 g - g /10 min					.23
Carbon Black Content ASTM D4218	Range			%			2.14
Carbon Black Dispersion ASTM D5596	Category						10 IN CAT 1
Tensile Strength ASTM D6693 ( 2 inches / minute )	Average Strength @ Yield	26	N/mm	148	ppi		2,465 psi
	Average Strength @ Break	48	N/mm	272	ppi		4,537 psi
Tensile Elongation ASTM D6693 ( 2 inches / minute ) Lo = 1.3" Yield Lo = 2.0" Break	Average Elongation @ Yield		%				16.33
	Average Elongation @ Break		%				829.7
Dimensional Stability ASTM D1204 (Modified)	Average Dimensional Change		%				-0.28
Tear Resistance ASTM D1004 (Modified)	Average Tear Resistance	222	N				49.996 lbs
Puncture Resistance FTMS 101 Method 2065 (Modified)	Load	402	N				90.416 lbs
Puncture Resistance ASTM D4833 (Modified)	Load	549	N				123.53 lbs
ESCR ASTM D1693	Minimum Hrs w / o Failures	1500	hrs				CERTIFIED
Notched Constant Tensile Load ASTM D5397	pass / fail @ 30%	300	hrs				ONGOING

Customer: **Erosion Control**  
 PO: **8385 Hawes Composting Fac.**  
 Destination **Barstow, CA**

Date: **2/25/11**  
 Signature: *[Signature]*  
 Manager, Quality Control Department  
 GOHDSM.FRM  
 REV 06  
 12/23/05



# quality certificate

ROLL # **908580-11** Lot # **8110197** Liner Type: **SMOOTH HDPE**

		METRIC	ENGLISH	Thickness	1.5mm	60mil		
Thickness Measurement ASTM D5199 (Modified)	MIN:	1.523 mm	60 mil	Length	164.594 m	540	feet	
	MAX:	1.581 mm	62 mil	Width	7.00 m	23.0	feet	
	AVE:	1.553 mm	61 mil	OIT(Standard) ASTM D3895	minutes	216		

Specific Gravity ASTM D792 Density g/cc .945

MFI ASTM D1238 COND. E GRADE: **K307** Melt Flow Index 190°C /2160 g - g /10 min .23

Carbon Black Content ASTM D4218 Range % 2.14

Carbon Black Dispersion ASTM D5596 Category 10 IN CAT 1

Tensile Strength ASTM D6693 ( 2 inches / minute ) Average Strength @ Yield 26 N/mm 148 ppi 2,465 psi

Average Strength @ Break 48 N/mm 272 ppi 4,537 psi

Tensile Elongation ASTM D6693 ( 2 inches / minute ) Average Elongation @ Yield % 16.33

Lo = 1.3" Yield Average Elongation @ Break % 829.7

Dimensional Stability ASTM D1204 (Modified) Average Dimensional Change % -0.28

Tear Resistance ASTM D1004 (Modified) Average Tear Resistance 222 N 49.996 lbs

Puncture Resistance FTMS 101 Method 2065 (Modified) Load 402 N 90.416 lbs

Puncture Resistance ASTM D4833 (Modified) Load 549 N 123.53 lbs

ESCR ASTM D1693 Minimum Hrs w / o Failures 1500 hrs CERTIFIED

Notched Constant Tensile Load ASTM D5397 pass / fail @ 30% 300 hrs ONGOING

Customer: **Erosion Control**  
 PO: **8385 Hawes Composting Fac.**  
 Destination **Barstow, CA**

Date: **2/25/11**  
 Signature: *[Handwritten Signature]*  
 Manager, Quality Control Department  
 60HDSM.FRM  
 REV 06  
 12/23/05

# SUBMITTAL CONTROL FORM



DATE: APRIL 27, 2011

JOB No: 103004

SUBMITTAL No: 9

PROJECT: NURSERY PRODUCTS HAWES  
COMPOSTING FACILITY

TO: Nursery Products  
ATTN: Chris Seney P. E.  
12277 Apple Valley Rd, Ste. 131  
Apple Valley, CA 92308  
PHONE: 760-272-1098  
FAX:  
EMAIL: nurseryproducts@charter.net

FROM: EC Applications, Inc. (ECA)  
Chris Fore  
415 W. Taft Ave, Suite H  
Orange, CA 92865  
PHONE: (714) 921-9848 x 104  
cfore@ecapplications.com

### WE ARE SUBMITTING THE ENCLOSED:

- SHOP DRAWINGS       CERTIFICATES OF COMPLIANCE       SAMPLES  
 MATERIAL DATA       QC INFORMATION       OTHER

### THESE ARE TRANSMITTED FOR:

- APPROVAL       INFORMATION       RESUBMIT  
 AS REQUESTED       FOR REVIEW      PREVIOUS SUB NO:

ITEM NO.	DESCRIPTION OF ITEM	NO. OF COPIES	CONTRACT REFERENCE/SPEC SECTION OR DRAWING SHEET NO.
1	GCL Manufacturers Quality Control Certifications	1	Design Plan April, 2010

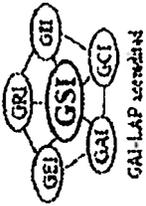
### NOTE:

THE ABOVE SUBMITTED ITEMS HAVE BEEN REVIEWED IN DETAIL AND ARE CORRECT AND IN GENERAL CONFORMANCE WITH THE CONTRACT DRAWINGS AND SPECIFICATIONS EXCEPT AS OTHERWISE STATED.

Chris Fore

EC Applications, Inc. AUTHORIZED SIGNATURE

IF THE ABOVE VARIANCES ARE ACCEPTABLE, PLEASE CONFIRM IN WRITING WITHIN TEN (10) DAYS, OTHERWISE WE WILL PROCEED PER THE PROPOSED VARIANCES



Date: 4/14/2011  
Purchase Order: 11007  
ORDER NUMBER: 027141703

EC Applications  
415 W. Taft Avenue  
Orange, CA 92865  
cfore@ecapplications.com; rbrito@ecapplications.com

To Whom it May Concern:

Please find enclosed the MQA/MQC test data package for Geosynthetic Clay Liner shipments to EC Applications.

The enclosed data package includes results of all the MQC tests required by ASTM D5889, with the exception of index flux/hydraulic conductivity. This test, which is run according to ASTM D5887, is normally performed once per production lot (once per week), unless a higher frequency is required by the project specifications. Because of the GCL's low permeability, this test can take several weeks to complete. The index flux/hydraulic conductivity results associated with this lot of material will be provided under separate cover as soon as they are available.

Although the index flux/hydraulic conductivity test results are not yet available, CETCO accepts responsibility for our GCL should the index flux/hydraulic conductivity tests produce unacceptable results. If, upon delivery and prior to installation, individual rolls of GCL are found to be nonconforming to accepted project specifications, CETCO will replace the nonconforming material at no charge.

Questions regarding this information should be directed to Chris Athanassopoulos, Technical Support Engineer, at (847) 851-1831.

Sincerely,

Roger B. Wilkerson  
Quality Assurance Coordinator  
CETCO Lovell Plant



**GEOSYNTHETIC CLAY LINER  
MANUFACTURING QUALITY ASSURANCE DATA PACKAGE**

PROJECT NAME: Dalton Trucking Yard

← TEMP Storage Yard

CUSTOMER P.O.: 11007

ORDER NUMBER: 027141703

PREPARED FOR: EC Applications

**CONTENTS:**

- Product Certifications
- GCL Order packing list and MQA tracking form
- GCL manufacturing quality control test data
- Bentonite clay certification
- Raw material test results

PREPARED BY: Roger B. Wilkerson  
Quality Assurance Coordinator  
CETCO  
P.O. Box 428  
92 Hwy. 37  
Lovell, WY 82431  
Telephone: 800-322-1149 ext. 413  
E-Mail: [rwilke@cetco.com](mailto:rwilke@cetco.com)



**PRODUCT CERTIFICATIONS**

PROJECT NAME: Dalton Trucking Yard  
CUSTOMER P.O.: 11007  
ORDER NUMBERS: 027141703  
PREPARED FOR: EC Applications

Temp. Storage Yard

The GCL manufactured for the above-referenced order number(s) is certified to meet the values listed in the tables below:

**GCL PROPERTY SPECIFICATIONS FOR BENTOMAT STM**

Test Method	Test Method Property	Test Frequency	Certified Value
ASTM D 5891	Bentonite Fluid Loss	1 per 50 Tons	18 ml Max
ASTM D 5993	Bentonite Mass/Area	40,000 sq ft (4000 sq m)	0.50 lb/sq ft Min
ASTM D 5890	Bentonite Swell Index	1 per 50 Tons	24 ml/2g Min
ASTM D 6768	GCL Grab Strength	200,000 sq ft (20,000 sq m)	30 lbs/in MARY
ASTM D 6243	GCL Hydrated Internal Shear Strength Periodic		500 psf typ @ 200 psf normal load
ASTM D 5887	GCL Hydraulic Conductivity	Weekly	1.0E-8 cm/ sec Max
ASTM D 5887	GCL Index Flux	Weekly	3.0E-8 m <sup>3</sup> /m <sup>2</sup> /sec Max
ASTM D 6496	GCL Peel Strength	40,000 sq ft (4000 sq m)	3.5 lbs/in Min

Bentonite property tests are performed at a bentonite processing facility before shipment to CETCO's production facility.  
All tensile testing is in the machine direction using ASTM D 6768. All peel strength testing is performed using ASTM D 6496. Upon request tensile and peel results can be reported per modified ASTM D 4632 using 4 inch grips.

**NEEDLE DETECTION AND REMOVAL PROCEDURE**

CETCO hereby affirms that all Bentomat<sup>®</sup> geosynthetic clay liner material manufactured for this project is continually passed under a magnet for needle removal and then screened with a metal detection device. CETCO certifies Bentomat<sup>®</sup> to be essentially free of broken needles and fragments of needles that would negatively effect the performance of the final product.

Roger B. Wilkerson  
Quality Assurance Coordinator



**GCL PACKING LIST AND MOA TRACKING FORM**

Listing of finished and raw materials used to produce certification package number 000271417

Order	GCL Lot #	GCL Roll #	Length	Width	Weight	sq. ft.	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Geotextiles		LO-WOVEN-STM	Base Roll #	Clay Lot #
											N/W-WHITE	Clay			
027141703	201116LO	52	150	15	2005	2250	50	201112CV	00000900	00000896	00000896	WEA018273-1	WEA018273-1	040811A	
027141703	201116LO	53	150	15	1990	2250	50	201112CV	00000900	00000896	00000896	WEA018273-1	WEA018273-1	040811A	
027141703	201116LO	54	150	15	2005	2250	50	201112CV	00000900	00000896	00000896	WEA018273-1	WEA018273-1	040811A	
027141703	201116LO	56	150	15	2030	2250	50	201112CV	00000900	00000896	00000896	WEA018273-1	WEA018273-1	040811B	
027141703	201116LO	57	150	15	1995	2250	50	201112CV	00000900	00000896	00000896	WEA018273-1	WEA018273-1	040811B	
027141703	201116LO	64	150	15	2055	2250	50	201112CV	00000871	00000871	00000871	WEA018273-4	WEA018273-4	040811B	
027141703	201116LO	73	150	15	2040	2250	67	201113CV	00000981	00000977	00000977	WEA018273-4	WEA018273-4	040811B	
027141703	201116LO	78	150	15	2040	2250	67	201113CV	00000981	00000977	00000977	WEA018273-4	WEA018273-4	040811B	
027141703	201116LO	79	150	15	2035	2250	67	201113CV	00000981	00000977	00000977	WEA018273-4	WEA018273-4	040811B	
027141703	201116LO	80	150	15	2030	2250	67	201113CV	00000968	00000961	00000961	WEA018273-4	WEA018273-4	040811B	
027141703	201116LO	81	150	15	2050	2250	67	201113CV	00000968	00000961	00000961	WEA018273-4	WEA018273-4	040811B	
027141703	201116LO	82	150	15	2045	2250	67	201113CV	00000968	00000961	00000961	WEA018273-4	WEA018273-4	040811B	
027141703	201116LO	83	150	15	1990	2250	67	201113CV	00000968	00000961	00000961	WEA018273-4	WEA018273-4	040811B	
027141703	201116LO	84	150	15	1995	2250	84	201113CV	00000968	00000961	00000961	WEA018273-4	WEA018273-4	040811B	
027141703	201116LO	86	150	15	2030	2250	84	201113CV	00000968	00000961	00000961	WEA018273-3	WEA018273-3	040811B	
027141703	201116LO	87	150	15	2010	2250	84	201112CV	00000872	00000871	00000871	WEA018273-3	WEA018273-3	040811B	
027141703	201116LO	88	150	15	2030	2250	84	201112CV	00000872	00000871	00000871	WEA018273-3	WEA018273-3	040811B	
027141703	201116LO	89	150	15	2040	2250	84	201112CV	00000872	00000871	00000871	WEA018273-3	WEA018273-3	040811B	

Total sq ft: 40500

Total Number of Rolls Certified: 18



### GCL MANUFACTURING QUALITY CONTROL TEST DATA

The following rolls in GCL certification package number 000271417 have been tested in our production facility lab.

Product	Lot # Tested	Roll # Tested	Mass Area	Grab Strength	Peel Strength
			D 5993	D 6768	D 6496
			ASTM Test Method:		
			Required Value: 0.50 lb/sq ft Min 30 lbs/in MARV 3.5 lbs/in Min		
LO-BENTOMAT STM	201116LO	50	0.58	97.4	5.3
LO-BENTOMAT STM	201116LO	67	0.60	97.4	5.3
LO-BENTOMAT STM	201116LO	84	0.57	97.4	6.0

### BENTONITE CLAY CERTIFICATION

The Bentonite Clay used to produce package 000271417

has been tested by American Colloid Company and yielded the following test results.

Clay Lot #	Moist	Swell	Fluid Loss
ASTM Test Method:	D 2216	D 5890	D 5891
Required Value:	12% Max	24 ml/2g Min	18 ml Max
040811A	11.20	28.00	14.80



## GEOTEXTILE TEST RESULTS FROM MATERIAL SUPPLIERS

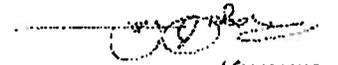
The GCL in certification package number 000271417 was manufactured with geotextiles which were tested with the following results.

BASE GEOTEXTILE				COVER GEOTEXTILE			
Material	Roll Number	Mass Area oz/yd <sup>2</sup>	Grab Strength lbs	Material	Roll Number	Mass Area oz/yd <sup>2</sup>	Grab Strength lbs
MATTEX WEA018273-1		3.5	187.5	CV-NON-WOVEN	00000871	7.1	39.9
MATTEX WEA018273-3		3.5	187.5	CV-NON-WOVEN	00000896	6.5	35.5
MATTEX WEA018273-4		3.5	187.1	CV-NON-WOVEN	00000961	6.7	39.9
				CV-NON-WOVEN	00000977	6.5	35.2

Certifications from our suppliers are on file at our production facility.

An \* or PT indicates supplier certifications were unavailable prior to shipping so testing was performed at a CETCO lab.

Roger B. Wilkerson  
Quality Assurance Coordinator  
CETCO Lovell Plant



Sincerely,

Questions regarding this information should be directed to Chris Athanassopoulos,  
Technical Support Engineer, at (847) 851-1831.

Although the index flux/hydraulic conductivity test results are not yet available, CETCO accepts responsibility for our GCL should the index flux/hydraulic conductivity tests produce unacceptable results. If, upon delivery and prior to installation, individual rolls of GCL are found to be nonconforming to accepted project specifications, CETCO will replace the nonconforming material at no charge.

The enclosed data package includes results of all the MQC tests required by ASTM D5889, with the exception of index flux/hydraulic conductivity. This test, which is run according to ASTM D5887, is normally performed once per production lot (once per week), unless a higher frequency is required by the project specifications. Because of the GCL's low permeability, this test can take several weeks to complete. The index flux/hydraulic conductivity results associated with this lot of material will be provided under separate cover as soon as they are available.

Please find enclosed the MQA/MQC test data package for Geosynthetic Clay Liner shipments to EC Applications.

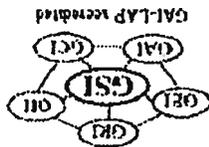
To Whom it May Concern:

EC Applications  
415 W. Taft Avenue  
Orange, CA 92865  
core@ecapplications.com; rbrio@ecapplications.com

ORDER NUMBER: 027141704

Purchase Order: 11007

Date: 4/15/2011





**GEOSYNTHETIC CLAY LINER  
MANUFACTURING QUALITY ASSURANCE DATA PACKAGE**

PROJECT NAME: Dalton Trucking Yard ←

Temp. Storage Yard

CUSTOMER P.O.: 11007

ORDER NUMBER: 027141704

PREPARED FOR: EC Applications

**CONTENTS:**

- Product Certifications
- GCL Order packing list and MQA tracking form
- GCL manufacturing quality control test data
- Bentonite clay certification
- Raw material test results

PREPARED BY: Roger B. Wilkerson  
Quality Assurance Coordinator  
CETCO  
P.O. Box 428  
92 Hwy. 37  
Lovell, WY 82431  
Telephone: 800-322-1149 ext. 413  
E-Mail: rwilke@cetco.com



**PRODUCT CERTIFICATIONS**

PROJECT NAME: Dalton Trucking Yard  
CUSTOMER P.O.: 11007  
ORDER NUMBERS: 027141704  
PREPARED FOR: EC Applications

Temp. Storage Yard

The GCL manufactured for the above-referenced order number(s) is certified to meet the values listed in the tables below:

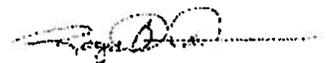
**GCL PROPERTY SPECIFICATIONS FOR BENTOMAT STM**

Test Method	Test Method Property	Test Frequency	Certified Value
ASTM D 5891	Bentonite Fluid Loss	1 per 50 Tons	18 ml Max
ASTM D 5993	Bentonite Mass/Area	40,000 sq ft (4000 sq m)	0.50 lb /sq ft Min
ASTM D 5890	Bentonite Swell Index	1 per 50 Tons	24 ml/2g Min
ASTM D 6768	GCL Grab Strength	200,000 sq ft (20,000 sq m)	30 lbs/in MARV
ASTM D 6243	GCL Hydrated Internal Shear Strength	Periodic	500 psf typ @ 200 psf normal load
ASTM D 5887	GCL Hydraulic Conductivity	Weekly	1.0E-8 cm/ sec Max
ASTM D 5887	GCL Index Flux	Weekly	3.0E-8 m3/in2/sec Max
ASTM D 6496	GCL Peel Strength	40,000 sq ft (4000 sq m)	3.5 lbs/in Min

Bentonite property tests are performed at a bentonite processing facility before shipment to CETCO's production facility. All tensile testing is in the machine direction using ASTM D 6768. All peel strength testing is performed using ASTM D 6496. Upon request tensile and peel results can be reported per modified ASTM D 4632 using 4 inch grips.

**NEEDLE DETECTION AND REMOVAL PROCEDURE**

CETCO hereby affirms that all Bentomat<sup>®</sup> geosynthetic clay liner material manufactured for this project is continually passed under a magnet for needle removal and then screened with a metal detection device. CETCO certifies Bentomat<sup>®</sup> to be essentially free of broken needles and fragments of needles that would negatively effect the performance of the final product.

  
Roger B. Wilkerson  
Quality Assurance Coordinator



**GCL PACKING LIST AND MQA TRACKING FORM**

Listing of finished and raw materials used to produce certification package number 000271417

GCL								Geotextiles				Clay	
LO-BENTOMAT STM								N/W-WHITE			LO-WOVEN-STM	LO-CG 50	
Order	GCL Lot #	GCL Roll #	Length	Width	weight	sq ft	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Base Roll #	Clay Lot #	
027141704	2011151.O	6	150	15	2000	2250	1	201113CV	00000970	00000961	WEA018273-15	040611A	
027141704	2011151.O	48	150	15	1980	2250	35	201112CV	00000829	00000828	WEA018303-13	040611A	
027141704	2011161.O	55	150	15	2005	2250	50	201112CV	00000900	00000896	WEA018273-1	040811A	
027141704	2011161.O	59	150	15	2015	2250	50	201112CV	00000871	00000871	WEA018273-1	040811B	
027141704	2011161.O	60	150	15	2000	2250	50	201112CV	00000871	00000871	WEA018273-4	040811B	
027141704	2011161.O	61	150	15	2045	2250	50	201112CV	00000871	00000871	WEA018273-4	040811B	
027141704	2011161.O	62	150	15	2040	2250	50	201112CV	00000871	00000871	WEA018273-4	040811B	
027141704	2011161.O	66	150	15	2040	2250	50	201112CV	00000868	00000868	WEA018273-4	040811B	
027141704	2011161.O	67	150	15	2040	2250	67	201112CV	00000868	00000868	WEA018273-4	040811B	
027141704	2011161.O	68	150	15	2025	2250	67	201112CV	00000868	00000868	WEA018273-4	040811B	
027141704	2011161.O	70	150	15	2025	2250	67	201112CV	00000868	00000868	WEA018273-4	040811B	
027141704	2011161.O	71	150	15	2020	2250	67	201112CV	00000868	00000868	WEA018273-4	040811B	
027141704	2011161.O	72	150	15	2015	2250	67	201112CV	00000868	00000868	WEA018273-4	040811B	
027141704	2011161.O	74	150	15	2050	2250	67	201113CV	00000981	00000977	WEA018273-4	040811B	
027141704	2011161.O	75	150	15	2050	2250	67	201113CV	00000981	00000977	WEA018273-4	040811B	
027141704	2011161.O	76	150	15	2015	2250	67	201113CV	00000981	00000977	WEA018273-4	040811B	
027141704	2011161.O	77	150	15	2010	2250	67	201113CV	00000981	00000977	WEA018273-4	040811B	
027141704	2011161.O	85	150	15	1990	2250	84	201113CV	00000968	00000961	WEA018273-4	040811B	
						<b>Total sq ft:</b>	<b>40500</b>					<b>Total Number of Rolls Certified:</b>	<b>18</b>



### GCL MANUFACTURING QUALITY CONTROL TEST DATA

The following rolls in GCL certification package number 000271417 have been tested in our production facility lab.

Product	Lot # Tested	Roll # Tested	Mass Area	Grab Strength	Peel Strength 6496
ASTM Test Method:			D 5993	D 6768	D 6496
Required Value:			0.50 lb /sq ft Min	30 lbs/in MARV	3.5 lbs/in Min
LO-BENTOMAT STM	201115LO	1	0.65	82.8	6.6
LO-BENTOMAT STM	201115LO	35	0.66	82.8	6.0
LO-BENTOMAT STM	201116LO	50	0.58	97.4	5.3
LO-BENTOMAT STM	201116LO	67	0.60	97.4	5.3
LO-BENTOMAT STM	201116LO	84	0.57	97.4	6.0

### BENTONITE CLAY CERTIFICATION

The Bentonite Clay used to produce package 000271417

has been tested by American Colloid Company and yielded the following test results.

Clay Lot #	Moist	Swell	Fluid Loss
ASTM Test Method:	D 2216	D 5890	D 5891
Required Value:	12% Max	24 ml/2g Min	18 ml Max
040611A	11.50	25.00	15.20
040811A	11.20	28.00	14.80



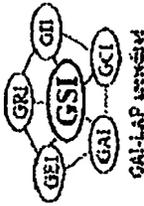
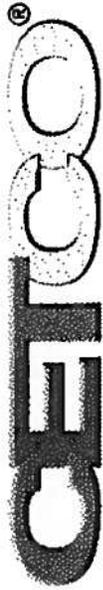
## GEOTEXTILE TEST RESULTS FROM MATERIAL SUPPLIERS

The GCL in certification package number 000271417 was manufactured with geotextiles which were tested with the following results.

BASE GEOTEXTILE				COVER GEOTEXTILE			
Material	Roll Number	Mass Area oz/yd <sup>2</sup>	Grab Strength lbs	Material	Roll Number	Mass Area oz/yd <sup>2</sup>	Grab Strength lbs
MATTEX	WEA018273-1	3.5	187.5	CV-NON-WOVEN	00000828	7.2	43.1
MATTEX	WEA018273-15	3.5	190.1	CV-NON-WOVEN	00000868	6.9	38.2
MATTEX	WEA018273-4	3.5	187.1	CV-NON-WOVEN	00000871	7.1	39.9
MATTEX	WEA018303-13	3.5	187.4	CV-NON-WOVEN	00000896	6.5	35.3
				CV-NON-WOVEN	00000961	6.7	39.9
				CV-NON-WOVEN	00000977	6.5	33.2

Certifications from our suppliers are on file at our production facility.

An "\*" or "PI" indicates supplier certifications were unavailable prior to shipping so testing was performed at a CETCO lab.



Date: 4/18/2011  
Purchase Order: 11007  
ORDER NUMBERS: 027141701, 027141702, 027141705

EC Applications  
415 W. Taft Avenue  
Orange, CA 92865  
cfore@ecapplications.com; rbrito@ecapplications.com

To Whom it May Concern:

Please find enclosed the MQA/MQC test data package for Geosynthetic Clay Liner shipments to EC Applications.

The enclosed data package includes results of all the MQC tests required by ASTM D5889, with the exception of index flux/hydraulic conductivity. This test, which is run according to ASTM D5887, is normally performed once per production lot (once per week), unless a higher frequency is required by the project specifications. Because of the GCL's low permeability, this test can take several weeks to complete. The index flux/hydraulic conductivity results associated with this lot of material will be provided under separate cover as soon as they are available.

Although the index flux/hydraulic conductivity test results are not yet available, CETCO accepts responsibility for our GCL should the index flux/hydraulic conductivity tests produce unacceptable results. If, upon delivery and prior to installation, individual rolls of GCL are found to be nonconforming to accepted project specifications, CETCO will replace the nonconforming material at no charge.

Questions regarding this information should be directed to Chris Athanassopoulos, Technical Support Engineer, at (847) 851-1831.

Sincerely,

Roger B. Wilkerson  
Quality Assurance Coordinator  
CETCO Lovell Plant



**GEOSYNTHETIC CLAY LINER  
MANUFACTURING QUALITY ASSURANCE DATA PACKAGE**

PROJECT NAME: Dalton Trucking Yard

← Temp. Storage Yard

CUSTOMER P.O.: 11007

ORDER NUMBERS: 027141701, 027141702, 027141705

PREPARED FOR: EC Applications

**CONTENTS:**

- Product Certifications
- GCL Order packing list and MQA tracking form
- GCL manufacturing quality control test data
- Bentonite clay certification
- Raw material test results

PREPARED BY: Roger B. Wilkerson  
Quality Assurance Coordinator  
CETCO

P.O. Box 428

92 Hwy. 37

Lovell, WY 82431

Telephone: 800-322-1149 ext. 413

E-Mail: [rwilke@cetco.com](mailto:rwilke@cetco.com)



**PRODUCT CERTIFICATIONS**

PROJECT NAME: Dalton Trucking Yard  
CUSTOMER P.O.: 11007  
ORDER NUMBERS: 027141701, 027141702, 027141705  
PREPARED FOR: EC Applications

Temp. Storage Yard

The GCL manufactured for the above-referenced order number(s) is certified to meet the values listed in the tables below:

**GCL PROPERTY SPECIFICATIONS FOR BENTOMAT STM**

Test Method	Test Method Property	Test Frequency	Certified Value
ASTM D 5891	Bentonite Fluid Loss	1 per 50 Tons	18 ml Max
ASTM D 5993	Bentonite Mass/Area	40,000 sq ft (4000 sq m)	0.50 lb/sq ft Min
ASTM D 5890	Bentonite Swell Index	1 per 50 Tons	24 ml/2g Min
ASTM D 6768	GCL Grab Strength	200,000 sq ft (20,000 sq m)	30 lbs/in MARV
ASTM D 6243	GCL Hydrated Internal Shear Strength Periodic	Weekly	500 psf typ @ 200 psf normal load
ASTM D 5887	GCL Hydraulic Conductivity	Weekly	1.0E-8 cm/sec Max
ASTM D 5887	GCL Index Flux	Weekly	3.0E-8 m <sup>3</sup> /m <sup>2</sup> /sec Max
ASTM D 6496	GCL Peel Strength	40,000 sq ft (4000 sq m)	3.5 lbs/in Min

Bentonite property tests are performed at a bentonite processing facility before shipment to CETCO's production facility. All tensile testing is in the machine direction using ASTM D 6768. All peel strength testing is performed using ASTM D 6496. Upon request tensile and peel results can be reported per modified ASTM D 4632 using 4 inch grips.

**NEEDLE DETECTION AND REMOVAL PROCEDURE**

CETCO hereby affirms that all Bentomat<sup>®</sup> geosynthetic clay liner material manufactured for this project is continually passed under a magnet for needle removal and then screened with a metal detection device. CETCO certifies Bentomat<sup>®</sup> to be essentially free of broken needles and fragments of needles that would negatively effect the performance of the final product.

Roger B. Wilkerson  
Quality Assurance Coordinator



**GCL PACKING LIST AND MOA TRACKING FORM**

Listing of finished and raw materials used to produce certification package number 000271417

Order	GCL Lot #	GCL Roll #	Length	Width	Weight	sq ft	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Geotextiles		Clay
											N/W-WHITE	LO-WOVEN-STM	
027141705	201115LO	1	150	15	2050	2250	1	201113CV	00000966	00000961	WEA018273-15	040611A	
027141705	201115LO	2	150	15	2010	2250	1	201113CV	00000966	00000961	WEA018273-15	040611A	
027141705	201115LO	3	150	15	2015	2250	1	201113CV	00000966	00000961	WEA018273-15	040611A	
027141705	201115LO	4	150	15	2015	2250	1	201113CV	00000970	00000961	WEA018273-15	040611A	
027141705	201115LO	5	150	15	2010	2250	1	201113CV	00000970	00000961	WEA018273-15	040611A	
027141705	201115LO	7	150	15	2010	2250	1	201113CV	00000970	00000961	WEA018273-15	040611A	
027141705	201115LO	8	150	15	2005	2250	1	201113CV	00000970	00000961	WEA018273-15	040611A	
027141701	201115LO	9	150	15	2000	2250	1	201113CV	00000970	00000961	WEA018273-15	040611B	
027141701	201115LO	10	150	15	2005	2250	1	201113CV	00000970	00000961	WEA018273-15	040611B	
027141701	201115LO	11	150	15	1985	2250	1	201113CV	00000969	00000961	WEA018273-15	040611B	
027141702	201115LO	12	150	15	1990	2250	1	201113CV	00000969	00000961	WEA018273-15	040611B	
027141702	201115LO	13	150	15	1985	2250	1	201113CV	00000969	00000961	WEA018273-15	040611B	
027141702	201115LO	14	150	15	2000	2250	1	201113CV	00000969	00000961	WEA018273-15	040611B	
027141702	201115LO	15	150	15	1995	2250	1	201113CV	00000969	00000961	WEA018273-15	040611B	
027141702	201115LO	16	150	15	2005	2250	1	201113CV	00000969	00000961	WEA018273-15	040611B	
027141702	201115LO	17	150	15	2010	2250	1	201113CV	00000969	00000961	WEA018273-15	040611B	
027141701	201115LO	18	150	15	2005	2250	18	201112CV	00000818	00000818	WEA018273-15	040611B	
027141701	201115LO	19	150	15	2000	2250	18	201112CV	00000818	00000818	WEA018273-16	040611B	
027141702	201115LO	20	150	15	2005	2250	18	201112CV	00000818	00000818	WEA018273-16	040611B	
027141702	201115LO	21	150	15	2010	2250	18	201112CV	00000818	00000818	WEA018273-16	040611B	
027141702	201115LO	22	150	15	2025	2250	18	201112CV	00000818	00000818	WEA018273-16	040611B	
027141702	201115LO	23	150	15	2000	2250	18	201112CV	00000818	00000818	WEA018273-16	040611B	
027141702	201115LO	24	150	15	2005	2250	18	201112CV	00000818	00000818	WEA018273-16	040611B	
027141701	201115LO	25	150	15	2000	2250	18	201112CV	00000845	00000843	WEA018273-16	040611B	
027141702	201115LO	26	150	15	1995	2250	18	201112CV	00000845	00000843	WEA018273-16	040611B	
027141702	201115LO	27	150	15	1995	2250	18	201112CV	00000845	00000843	WEA018273-16	040611B	
027141702	201115LO	28	150	15	2005	2250	18	201112CV	00000845	00000843	WEA018273-16	040611B	
027141701	201115LO	29	150	15	2010	2250	18	201112CV	00000845	00000843	WEA018273-16	040611B	
027141702	201115LO	30	150	15	2015	2250	18	201112CV	00000845	00000843	WEA018273-16	040611B	
027141702	201115LO	31	150	15	2000	2250	18	201112CV	00000845	00000843	WEA018273-16	040611B	
027141705	201115LO	32	150	15	1995	2250	18	201112CV	00000828	00000828	WEA018273-16	040611B	

Order	GCL Lot #	GCL Roll #	Length	Width	Weight	sq ft	Roll # Tested	Cap Lot #	Cap Roll #	Roll # Tested	Base Roll #	Clay Lot #
027141701	201115LO	33	150	15	2085	2250	18	201112CV	00000828	00000828	WEA018273-16	040611B
027141701	201115LO	34	150	15	1990	2250	18	201112CV	00000828	00000828	WEA018273-16	040611B
027141702	201115LO	35	150	15	2010	2250	35	201112CV	00000828	00000828	WEA018273-16	040611B
027141701	201115LO	36	150	15	1990	2250	35	201112CV	00000828	00000828	WEA018273-16	040611B
027141701	201115LO	37	150	15	2000	2250	35	201112CV	00000828	00000828	WEA018273-16	040611B
027141702	201115LO	38	150	15	2005	2250	35	201112CV	00000828	00000828	WEA018273-16	040611B
027141701	201115LO	39	150	15	2000	2250	35	201112CV	00000832	00000828	WEA018273-16	040611B
027141705	201115LO	40	150	15	2010	2250	35	201112CV	00000832	00000828	WEA018273-16	040611B
027141701	201115LO	41	150	15	2015	2250	35	201112CV	00000832	00000828	WEA018273-16	040611B
027141701	201115LO	42	150	15	1985	2250	35	201112CV	00000832	00000828	WEA018273-16	040611B
027141701	201115LO	43	150	15	1985	2250	35	201112CV	00000832	00000828	WEA018273-16	040611B
027141705	201115LO	44	150	15	1995	2250	35	201113CV	00000966	00000961	WEA018273-15	040611A
027141701	201115LO	45	150	15	2005	2250	35	201113CV	00000966	00000961	WEA018303-13	040611A
027141701	201115LO	46	150	15	2010	2250	35	201112CV	00000829	00000828	WEA018303-13	040611A
027141701	201115LO	47	150	15	1985	2250	35	201112CV	00000829	00000828	WEA018303-13	040611A
027141705	201116LO	50	150	15	1985	2250	50	201112CV	00000891	00000884	WEA018273-1	040811A
027141705	201116LO	51	150	15	1975	2250	50	201112CV	00000891	00000884	WEA018273-1	040811A
027141705	201116LO	58	150	15	1990	2250	50	201112CV	00000900	00000896	WEA018273-1	040811B
027141705	201116LO	63	150	15	2060	2250	50	201112CV	00000871	00000871	WEA018273-4	040811B
027141705	201116LO	65	150	15	2050	2250	50	201112CV	00000871	00000871	WEA018273-4	040811B
027141705	201116LO	69	150	15	2030	2250	67	201112CV	00000868	00000868	WEA018273-4	040811B

Total sq ft: 117000

Total Number of Rolls Certified: 52



### GCL MANUFACTURING QUALITY CONTROL TEST DATA

The following rolls in GCL certification package number 000271417 have been tested in our production facility lab.

Product	Lot #	Tested	Roll #	Tested	Mass Area	Grab Strength	Peel Strength
					D 5993	D 6768	D 6496
					ASTM Test Method: D 5993 D 6768 D 6496		
					Required Value: 0.50 lb/sq ft Min 30 lbs/in MARY 3.5 lbs/in Min		
LO-BENTOMAT STM	201113LO		1		0.65	82.8	6.6
LO-BENTOMAT STM	201115LO		18		0.60	82.8	6.0
LO-BENTOMAT STM	201115LO		35		0.66	82.8	6.0
LO-BENTOMAT STM	201116LO		50		0.58	97.4	5.3
LO-BENTOMAT STM	201116LO		67		0.60	97.4	5.3

### BENTONITE CLAY CERTIFICATION

The Bentonite Clay used to produce package 000271417 has been tested by American Colloid Company and yielded the following test results.

Clay Lot #	Moist	Swell	Fluid Loss
	D 2216	D 5890	D 5891
	ASTM Test Method: D 2216 D 5890 D 5891		
	Required Value: 12% Max 24 ml/2g Min 18 ml Max		
040611A	11.50	25.00	15.20
040611B	10.20	24.00	15.20
040811A	11.20	28.00	14.80



### GEOTEXTILE TEST RESULTS FROM MATERIAL SUPPLIERS

The GCL in certification package number 000271417 was manufactured with geotextiles which were tested with the following results.

BASE GEOTEXTILE				COVER GEOTEXTILE			
Material	Roll Number	Mass Area oz/yd <sup>2</sup>	Grab Strength lbs	Material	Roll Number	Mass Area oz/yd <sup>2</sup>	Grab Strength lbs
MATTEX	WEA018273-1	3.5	187.5	CV-NON-WOVEN	00000818	6.7	37.3
MATTEX	WEA018273-15	3.5	190.1	CV-NON-WOVEN	00000828	7.2	43.1
MATTEX	WEA018273-16	3.5	192.0	CV-NON-WOVEN	00000843	6.7	40.7
MATTEX	WEA018273-4	3.5	187.1	CV-NON-WOVEN	00000868	6.9	38.2
MATTEX	WEA018303-13	3.5	187.4	CV-NON-WOVEN	00000871	7.1	39.9
				CV-NON-WOVEN	00000884	6.8	36.4
				CV-NON-WOVEN	00000896	6.5	33.3
				CV-NON-WOVEN	00000961	6.7	39.9

Certifications from our suppliers are on file at our production facility.

An "w" or "PT" indicates supplier certifications were unavailable prior to shipping so testing was performed at a CETCO lab.

# SUBMITTAL CONTROL FORM

DATE: FEBRUARY 22, 2012

JOB NO: 103004

SUBMITTAL NO: 12

PROJECT: NURSERY PRODUCTS HAWES  
COMPOSTING FACILITY



**ECApplications**  
INC.

TO:

Nursery Products

ATTN:

Chris Sency P. E.

12277 Apple Valley Rd, Ste. 131

Apple Valley, CA 92308

PHONE:

760-272-1098

FAX:

EMAIL:

nurseryproducts@charter.net

FROM:

EC Applications, Inc. (ECA)

Chris Fore

415 W. Taff Ave, Suite H

Orange, CA 92865

PHONE:

(714) 921-9848 x 104

cfore@ecapplications.com

**WE ARE SUBMITTING THE ENCLOSED:**

- SHOP DRAWINGS
- CERTIFICATES OF COMPLIANCE
- SAMPLES
- MATERIAL DATA
- QC INFORMATION
- OTHER

**THESE ARE TRANSMITTED FOR:**

- APPROVAL
- INFORMATION
- RESUBMIT
- AS REQUESTED
- FOR REVIEW

PREV SUB NO:

**NOTE:**

THE ABOVE SUBMITTED ITEMS HAVE BEEN REVIEWED IN DETAIL AND ARE CORRECT AND IN GENERAL CONFORMANCE WITH THE CONTRACT DRAWINGS AND SPECIFICATIONS EXCEPT AS OTHERWISE STATED.

Chris Fore

EC Applications, Inc. AUTHORIZED SIGNATURE

IF THE ABOVE VARIANCES ARE ACCEPTABLE, PLEASE CONFIRM IN WRITING WITHIN TEN (10) DAYS, OTHERWISE WE WILL PROCEED PER THE PROPOSED VARIANCES



SKAPS Industries (Nonwoven Division)  
 335, Athena Drive  
 Athens, GA 30601 (U.S.A.)  
 Phone (706) 354-3700 Fax (706) 354-3737  
 E-mail: info@skaps.com

Sales Office:  
 Engineered Synthetic Product Inc.  
 Phone: (770)564-1857  
 Fax: (770)564-1818

January 23, 2012  
 EC Applications Inc.  
 650 N. Batavia Street  
 Orange, CA, 92868

Dear Sir/Madam:

This is to certify that SKAPS GT180 is a high quality needle-punched nonwoven geotextile made of 100% polypropylene staple fibers, randomly networked to form a high strength dimensionally stable fabric. SKAPS GT180 resists ultraviolet deterioration, rotting, biological degradation. The fabric is inert to commonly encountered soil chemicals. Polypropylene is stable within a pH range of 2 to 13. SKAPS GT180 conforms to the property values listed below:

PROPERTY	TEST METHOD	UNITS	M.A.R.V. Minimum Average Roll Value
Weight(Typical)	ASTM D 5261	oz/sy (g/m <sup>2</sup> )	8.00 (27.1)
Grab Tensile	ASTM D 4632	lbs (kN)	205 (0.91)
Grab Elongation	ASTM D 4632	%	50
Trapezoidal Tear	ASTM D 4533	lbs (kN)	85 (0.38)
Puncture Resistance	ASTM D 4833	lbs (kN)	130 (0.58)
Permittivity*	ASTM D 4491	sec <sup>-1</sup>	1.40
Water Flow*	ASTM D 4491	gpm/ft <sup>2</sup> (l/min/m <sup>2</sup> )	90 (3667)
AOS*	ASTM D 4751	US Sieve (mm)	80 (0.18)
UV Resistance	ASTM D 4355	%/hrs	70/500

**Notes:**

\* At the time of manufacturing. Handling may change these properties.

**ANURAG SHAH**  
 QUALITY CONTROL MANAGER

www.skaps.com

www.espgeosynthetics.com

**Product : GT180-180**

ROLL # ASTM METHOD UNITS TARGET	WEIGHT* D5261 oz/sq yd 8.00	MD TENSILE D4632 lbs. 205	MD ELONG D4632 % 50	XMD TENSILE D4632 lbs 205	XMD ELONG D4632 % 50	MD TRAP D4533 lbs. 85	XMD TRAP D4533 lbs 85	PUNCTURE D4833 lbs. 130	AOS D4751 US Sieve 80	WATER FLOW D4491 gpm/ft <sup>2</sup> 90	PERMITTIVITY D4491 sec <sup>-1</sup> 1.40
030368072	8.01	211	68	233	89	94	109	137	80	113	1.51
030368073	8.01	211	68	233	89	94	109	137	80	113	1.51

\*Weights typical. All other values are MARV.

# SUBMITTAL CONTROL FORM



DATE: FEBRUARY 27, 2012

JOB NO: 103004

SUBMITTAL NO: 13

PROJECT: NURSERY PRODUCTS HAWES  
COMPOSTING FACILITY

TO: Nursery Products  
ATTN: Chris Sency P. E.  
12277 Apple Valley Rd, Ste. 131  
Apple Valley, CA 92308  
PHONE: 760-272-1098  
FAX:  
EMAIL: nurseryproducts@charter.net

FROM: EC Applications, Inc. (ECA)  
Ruben Brito  
650 N. Batavia Street  
Orange, CA 92868  
PHONE: (714) 921-9848 x 102  
rbrito@ecapplications.com

### WE ARE SUBMITTING THE ENCLOSED:

- SHOP DRAWINGS       CERTIFICATES OF COMPLIANCE       SAMPLES  
 MATERIAL DATA       QC INFORMATION       OTHER

### THESE ARE TRANSMITTED FOR:

- APPROVAL       INFORMATION  
 AS REQUESTED       RESUBMIT  
 FOR REVIEW

PREV SUB NO:

ITEM NO.	DESCRIPTION OF ITEM	NO. OF COPIES	CONTRACT REFERENCE/SPEC SECTION OR DRAWING SHEET NO.
1	Gravel 1. Gradation 2. Hydraulic Conductivity 3. Calcium Carbonate	1	Design Plan April, 2010

### NOTE:

**THE ABOVE SUBMITTED ITEMS HAVE BEEN REVIEWED IN DETAIL AND ARE CORRECT AND IN GENERAL CONFORMANCE WITH THE CONTRACT DRAWINGS AND SPECIFICATIONS EXCEPT AS OTHERWISE STATED.**

Ruben Brito

EC Applications, Inc. AUTHORIZED SIGNATURE

**IF THE ABOVE VARIANCES ARE ACCEPTABLE, PLEASE CONFIRM IN WRITING WITHIN TEN (10) DAYS, OTHERWISE WE WILL PROCEED PER THE PROPOSED VARIANCES**

**VULCAN MATERIALS COMPANY - Western Division**

Contractor: **Zero Energy Institute**  
**Attn: Shannon M. Goodrich**

February 27, 2012

Project: **Nursery Products Hawes Composting Facility**

Plant: **Vulcan Materials / Palmdale**

Material: **1" X # 4 Gravel (ASTM #56)**

This is to certify that Vulcan Materials Company, Western Division, Palmdale, will supply 1" x # 4 gravel (ASTM #56) to the above listed project and that this product will conform to Tables #2 & #3 of ASTM designation C33 - 11.

Sieve Size	ASTM C33 Table 2 - size # 56	Percent Passing
37.5 mm (1 1/2")	100	100
25 mm (1")	90 - 100	97
19 mm (3/4")	40 - 85	78
12.5 mm (1/2")	10 - 40	34
9.5 mm (3/8")	0 - 15	11
4.75 mm (No. 4)	0 - 5	3
75 um (No. 200)	0 - 1	0.5

**Table 3 - Negligible Weathering Region**

	method	result	spec.
Clay Lumps / Friable Particles	C 142	0.4%	5 % Max.
Material Finer than #200	C 117	0.5%	1.0 % Max.
Coal and Lignite	C 123	0.0%	0.5 % Max.
Abrasion (B) 500 rev.s	C 131	46%	50 % Max.

Submitted by:

  
 Jeff Colhard  
 Technical Services Supervisor

**\* Please Note: \*\* NOT VALID IF ALTERED \*\***

If you should have any questions regarding this submittal please contact the Los Angeles Regional Laboratory at (626) 856-6190

**Appendix C**  
**HDPE & GCL**  
**CQC Documentation**  
**Surface Impoundments A and B**

# Surface Impoundment A

P94	P93	P86	P85	P84	P83	P82	P81	P74	P73	P71	P70	P69	P66	P65	P4	P57	P55	P54	P49	P48	P44	P43	P42	P41	P40	P37	P36	P2	P21	P22
										P68	P72							P50						P39	P38					
P87																														
P88																														
P89																														
P90																														
P91																														
P95																														
P96																														
P97																														
P98																														
P99																														
P100																														
P103	P102																													
P104																														

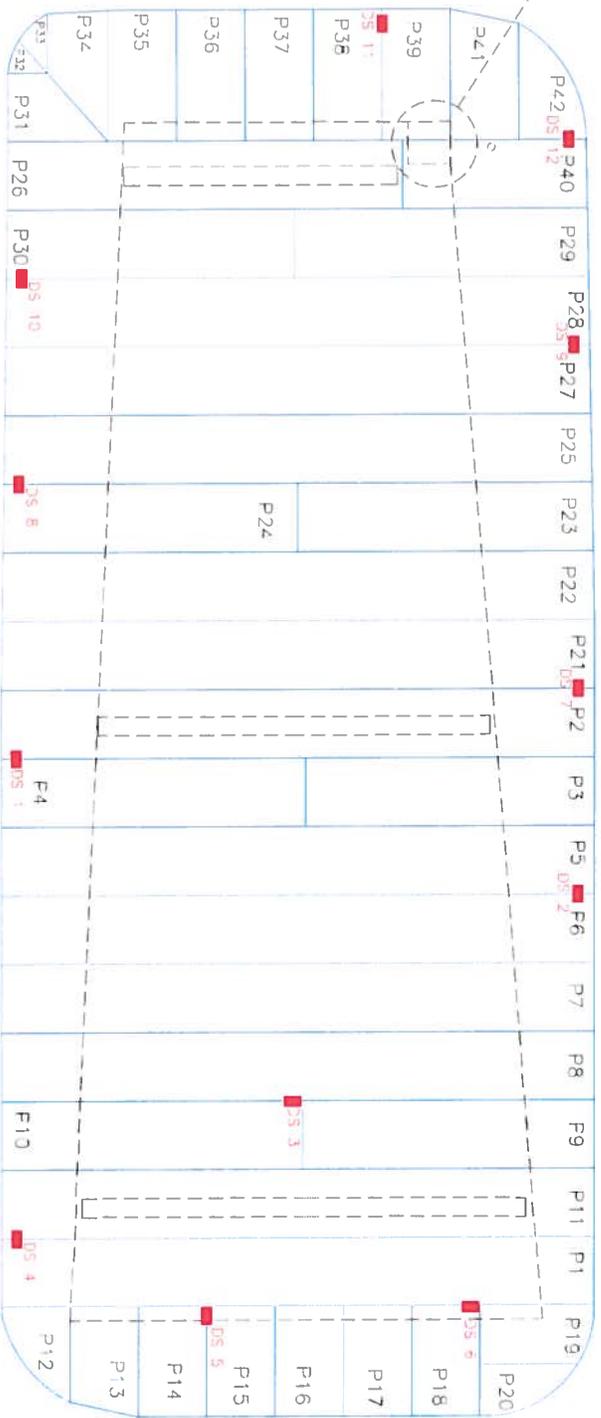
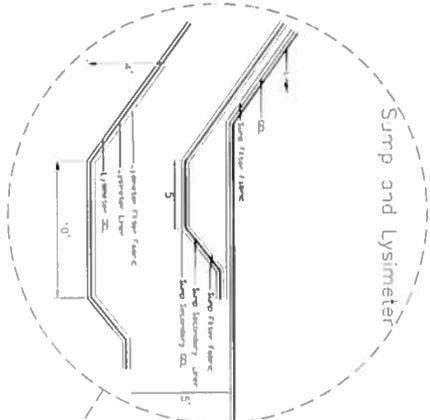
**REVISIONS/NOTES**

<b>Panel Numbers</b>			
<b>Destructive Samples</b>			
<b>Records larger than the destructive samples</b>			
<b>Pre-Perforation Seal</b>			
<b>Seams</b>			

Nursery Products - Hawes Composting Facility	Retention Basin A Geosynthetic Clay Liner As-Built	Geosynthetic Clay Liner	
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**BCApplications**  
550 N. Salsburg Street  
ORANGE, CA 92668 1-904  
TEL: (949) 471-1234 FAX: (949) 471-1235  
WWW: www.bcapplications.com



REVISIONS/NOTES

1	Panel Numbers
2	Restorative Samplers
3	repairs later then the destructive samples
4	Final Perforation Spot
5	Summ

Nursery Products - Hawes  
Composting Facility

Retention Basin A  
Geomembrane  
As-Built

60 vii HPE  
Smooth Liner

**ECApplications**  
650 N. Sotolova Street  
ORANGE, CA 92668  
TEL: (714) 971-9846  
FAX: (714) 971-4200  
Email: info@ecapplications.com

DATE: 7/24/2013  
SCALE: 1"=20'-0"  
PROJECT: Nursery Products





# EC Applications Inc.

2

Project Name: Nursery Products

Material Type: 60 mil HDPE

Job Description: Reported By: victor rodriguez

Other: \_\_\_\_\_

Job # 103004

Primary  Secondary

Pond  Cell  Pad

Superintendent:

Vicente Figueroa

Air Pressure Test

Allowable Air Pressure Loss

Extrusion LF Weld Total To Date

1,960

Fusion LF Weld Tot.

Weld Date	Seam No.	Seam Length	Time Welded	Operator Name/ID	Mach No.	Mach Speed	Mach Temp	Preheat Temp	Ambient Temp	Test Date	Test Type	AT Time PSI IN	Ink Time PSI OUT	PSI Loss	Test Result
3/9/12	3 / 4	23	10:28	emilio gutierrez	59	3.5	750		48	3/9/12	Air Pressure	5:09 30	5:14 30		Pass
3/9/12	2 / 4	103	10:24	librado dominguez	53	3.2	750		48	3/9/12	Air Pressure	5:13 30	5:18 30		Pass
3/9/12	2 / 3	107	10:35	librado dominguez	53	3.2	750		50	3/9/12	Air Pressure	5:04 30	5:09 30		Pass
3/9/12	4 / 5	104	10:40	emilio gutierrez	59	3.5	750		50	3/9/12	Air Pressure	5:09 30	5:14 30		Pass
3/9/12	3 / 5	107	10:55	emilio gutierrez	59	3.5	750		55	3/9/12	Air Pressure	5:03 30	5:08 30		Pass
3/9/12	5 / 6	211	10:45	roque martinez	52	3.5	750		55	3/9/12	Air Pressure	4:56 30	4:59 30		Pass
3/9/12	6 / 7	212	11:05	librado dominguez	53	3.2	750		60	3/9/12	Air Pressure	4:55 30	5:00 30		Pass
3/9/12	7 / 8	212	11:20	emilio gutierrez	59	3.5	750		60	3/9/12	Air Pressure	4:44 30	4:49 30		Pass
3/9/12	9 / 10	23	11:30	librado dominguez	53	3.2	750		60	3/9/12	Air Pressure	4:25 30	4:30 30		Pass
3/9/12	8 / 10	108	11:27	roque martinez	52	3.5	750		60	3/9/12	Air Pressure	4:26 30	4:31 30		Pass
3/9/12	8 / 9	106	11:48	roque martinez	52	3.5	750		65	3/9/12	Air Pressure	4:42 30	4:47 30		Pass
3/9/12	10 / 11	109	11:38	librado dominguez	53	3.2	750		65	3/9/12	Air Pressure	4:25 30	4:30 30		Pass
3/9/12	9 / 11	106	11:56	librado dominguez	53	3.2	750		65	3/9/12	Air Pressure	4:37 30	4:42 30		Pass
3/9/12	11 / 1	215	11:58	emilio gutierrez	59	3.5	750		65	3/9/12	Air Pressure	4:36 30	4:41 30		Pass
3/9/12	12 / 13	38	1:35	librado dominguez	53	4	750		70	3/9/12	Air Pressure	2:24 30	2:29 30		Pass
3/9/12	13 / 14	43	1:45	librado dominguez	53	4	750		70	3/9/12	Air Pressure	2:25 30	2:30 30		Pass
3/9/12	14 / 15	44	1:46	emilio gutierrez	59	4	750		70	3/9/12	Air Pressure	2:26 30	2:29 30		Pass

# EC Applications Inc.

Project Name: Nursery Products

Material Type: 60 mil HDPE

Job Description:

Reported By: victor rodriguez

Other:

Job # 103004

2

Superintendent:

Vicente Figueroa

Primary

Pond Cell

x

Secondary

Pad

x

Air Pressure Test

Allowable Air Pressure Loss

4.714 Total LF of Welding to Date Combined

Extrusion LF Weld Total To Date

1,950

Fusion LF Weld Tot

Weld Date	Seam No.	Seam Length	Time Welded	Operator Name/ID	Mach No.	Mach Speed	Mach Temp	Preheat Temp	Ambient Temp	Test Date	Test Type	AT Time PSI IN	AT Time PSI OUT	PSI Loss	Test Result
3/9/12	15 / 16	46	1:55	librado dominguez	53	4	750		70	3/9/12	Air Pressure	2:37 30	2:42 30		Pass
3/9/12	16 / 17	46	2:06	librado dominguez	53	4	750		70	3/9/12	Air Pressure	2:44 30	2:49 30		Pass
3/9/12	17 / 18	46	2:14	librado dominguez	53	4	750		70	3/9/12	Air Pressure	2:45 30	2:50 30		Pass
3/9/12	19 / 20	43	2:23	librado dominguez	53	4	750		70	3/9/12	Air Pressure	2:56 30	3:01 30		Pass
3/9/12	18 / 20	23	2:34	librado dominguez	53	4	750		70	3/9/12	Air Pressure	2:58 30	3:03 30		Pass
3/9/12	18 / 19	23	2:36	librado dominguez	53	4	750		70	3/9/12	Air Pressure	2:50 30	2:55 30		Pass
3/9/12	1 / 12	23	3:07	librado dominguez	53	4	750		70	3/9/12	Air Pressure	3:35 30	3:40 30		Pass
3/9/12	1 / 14	23	3:10	librado dominguez	53	4	750		70	3/9/12	Air Pressure	3:53 30	3:58 30		Pass
3/9/12	1 / 15	23	3:12	librado dominguez	53	4	750		70	3/9/12	Air Pressure	3:55 30	4:00 30		Pass
3/9/12	1 / 16	23	3:14	librado dominguez	53	4	750		70	3/9/12	Air Pressure	3:56 30	4:01 30		Pass
3/9/12	1 / 17	23	3:16	librado dominguez	53	4	750		70	3/9/12	Air Pressure	4:05 30	4:10 30		Pass
3/9/12	1 / 18	23	3:18	librado dominguez	53	4	750		70	3/9/12	Air Pressure	4:08 30	4:13 30		Pass
3/9/12	1 / 19	51	3:20	librado dominguez	53	4	750		70	3/9/12	Air Pressure	4:15 30	4:20 30		Pass
3/10/12	2 / 21	2:10	8:56	librado dominguez	53	4	750		60	3/10/12	Air Pressure	10:00 30	10:05 30		Pass
3/10/12	21 / 22	208	9:02	emilio gutierrez	59	4	750		60	3/10/12	Air Pressure	10:06 30	10:11 30		Pass
3/10/12	23 / 24	23	9:24	librado dominguez	53	4	750		60	3/10/12	Air Pressure	10:22 30	10:27 30		Pass
3/10/12	22 / 23	1:05	9:52	librado dominguez	53	4	750		60	3/10/12	Air Pressure	10:26 30	10:31 30		Pass

# EC Applications Inc.

2

Project Name:

Nursery Products

Job # 103C04

Superintendent:

Vicente Figueroa

Material Type:

60 mil HDPE

Primary

Pond

X

Air Pressure Test

Job Description:

victor rodriguez

Secondary

Cell

A

Air Pressure Hold Time

Reported By:

victor rodriguez

Other

Pad

A

Allowable Air Pressure Loss

4.714 Total LF of Welding to Date Combined

Extrusion LF Weld Total To Date

1,960

Fusion LF Weld Tot

Weld Date	Seam No.	Seam Length	Time Welded	Operator Name/ID	Mach No.	Mach Speed	Mach Temp	Preheat Temp	Ambient Temp	Test Date	Test Type	AT Time PSI IN	HT Time PSI OUT	PSI Loss	Test Result
3/10/12	22 / 24	104	9:34	librado dominguez	53	4	750		60	3/10/12	Air Pressure	10:06 30	10:11 30		Pass
3/10/12	24 / 25	104	9:55	emilio gutierrez	59	4	750		60	3/10/12	Air Pressure	10:24 30	10:29 30		Pass
3/10/12	23 / 25	105	10:14	emilio gutierrez	59	4	750		60	3/10/12	Air Pressure	10:34 30	10:39 30		Pass
3/12/12	25 / 27	210	##:42	librado dominguez	53	4	750		55	3/12/12	Air Pressure	1:15 30	1:20 30		Pass
3/12/12	27 / 28	210	10:46	emilio gutierrez	59	3.5	750		55	3/12/12	Air Pressure	1:17 30	1:23 30		Pass
3/12/12	28 / 30	104	11:08	librado dominguez	53	4	750		60	3/12/12	Air Pressure	1:18 30	1:23 30		Pass
3/12/12	28 / 29	106	11:27	librado dominguez	53	4	750		60	3/12/12	Air Pressure	1:40 30	1:45 30		Pass
3/12/12	29 / 30	23	11:08	librado dominguez	53	4	750		60	3/12/12	Air Pressure	1:30 30	1:35 30		Pass
3/12/12	30 / 26	104	11:33	emilio gutierrez	59	3.5	750		60	3/12/12	Air Pressure	1:20 30	1:25 30		Pass
3/12/12	29 / 26	60	11:50	emilio gutierrez	59	3.5	750		60	3/12/12	Air Pressure	1:34 30	1:39 30		Pass
3/12/12	26 / 31	51	1:36	librado dominguez	53	4	750		70	3/12/12	Air Pressure	2:47 30	2:53 30		Pass
3/12/12	31 / 32	25	1:28	librado dominguez	53	4	750		70	3/12/12	Air Pressure	2:51 30	2:56 30		Pass
3/12/12	33 / 34	28	1:42	emilio gutierrez	59	3.5	750		70	3/12/12	Air Pressure	2:57 30	3:02 30		Pass
3/12/12	34 / 35	53	1:46	librado dominguez	53	4	750		70	3/12/12	Air Pressure	2:48 30	2:53 30		Pass
3/12/12	31 / 34	33	2:00	emilio gutierrez	59	3.5	750		70	3/12/12	Air Pressure	2:50 30	2:55 30		Pass
3/12/12	32 / 33	23	2:05	emilio gutierrez	59	3.5	750		70	3/12/12	Air Pressure	2:56 30	3:01 30		Pass
3/12/12	35 / 36	53	1:56	librado dominguez	53	4	750		70	3/12/12	Air Pressure	3:04 30	3:09 30		Pass



Project Name: Nursery Products Job # 103004 Deployment Date \_\_\_\_\_

Superintendent: Vicente Figueroa Material Type: 60 Mil

Primary  Secondary  Cell  Pond  Pad  Other: \_\_\_\_\_

Description (i.e. Phase #, Cell #, Pond # etc.)

Roll Stock Width \_\_\_\_\_

Panel #	Panel #	Panel #																																																
cap 1 Roll # <u>8572</u>  Notes: Initial SF: 1,125 Lineal Feet Trench Final SF: 1,125	cap 2 Roll # <u>8572</u>  Notes: Initial SF: 1,125 Lineal Feet Trench Final SF: 1,125	cap 3 Roll # <u>8572</u>  Notes: Initial SF: 675 Lineal Feet Trench Final SF: 675																																																
Panel # _____ Roll # _____  Notes: Initial SF: - Lineal Feet Trench Final SF: -	Panel # _____ Roll # _____  Notes: Initial SF: - Lineal Feet Trench Final SF: -	Panel # _____ Roll # _____  Notes: Initial SF: - Lineal Feet Trench Final SF: -																																																
Panel # _____ Roll # _____  Notes: Initial SF: - Lineal Feet Trench Final SF: -	Panel # _____ Roll # _____  Notes: Initial SF: - Lineal Feet Trench Final SF: -	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3">Material in Anchor Trench</th> </tr> </thead> <tbody> <tr> <td>Total LF In Trench This Page</td> <td>-</td> <td>LF</td> </tr> <tr> <td>Depth and Width Allowed in Trench</td> <td>10</td> <td>LF</td> </tr> <tr> <td>Total SF Trench This Page</td> <td>-</td> <td>SF</td> </tr> <tr> <td>Total Panel SF This Page</td> <td>2,925</td> <td>SF</td> </tr> <tr> <td>Total Pay Area This Page</td> <td>2,925</td> <td>SF</td> </tr> <tr> <td>LF In Trench Previous</td> <td>-</td> <td>LF</td> </tr> <tr> <td>LF In Trench To Date</td> <td>-</td> <td>LF</td> </tr> <tr> <td>SF In Trench Previous</td> <td>-</td> <td>SF</td> </tr> <tr> <td>Total SF in Trench to Date</td> <td>-</td> <td>SF</td> </tr> <tr> <td>Total Panel SF Previous</td> <td>-</td> <td>SF</td> </tr> <tr> <td>Total Panel SF To Date</td> <td>2,925</td> <td>SF</td> </tr> <tr> <td colspan="2">Total Pay Area To Date Including Anchor Trench</td> <td>2,925</td> </tr> <tr> <td>Initial Quantity Previous</td> <td>-</td> <td>SF</td> </tr> <tr> <td>Initial Quantity This Page</td> <td>2,925</td> <td>SF</td> </tr> <tr> <td>Initial Quantity To Date</td> <td>2,925</td> <td>SF</td> </tr> </tbody> </table>	Material in Anchor Trench			Total LF In Trench This Page	-	LF	Depth and Width Allowed in Trench	10	LF	Total SF Trench This Page	-	SF	Total Panel SF This Page	2,925	SF	Total Pay Area This Page	2,925	SF	LF In Trench Previous	-	LF	LF In Trench To Date	-	LF	SF In Trench Previous	-	SF	Total SF in Trench to Date	-	SF	Total Panel SF Previous	-	SF	Total Panel SF To Date	2,925	SF	Total Pay Area To Date Including Anchor Trench		2,925	Initial Quantity Previous	-	SF	Initial Quantity This Page	2,925	SF	Initial Quantity To Date	2,925	SF
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Project Name: Nursery Products Job # 103004 Deployment Date 03/08/12

Superintendent: Vicente Figueroa Material Type: 60 mil HDPE

Primary  Secondary  Cell  Pond  Pad  Other: \_\_\_\_\_

Description (i.e. Phase #, Cell #, Pond # etc.)

Roll Stock Width 23

Panel #	Roll #	Panel #	Roll #	Panel #	Roll #																																																
1	8468	2	8468																																																		
<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>Final Length Avg</td><td>195.00</td><td>LF</td></tr> <tr><td>Final Width Avg</td><td>22.50</td><td>LF</td></tr> <tr><td>Initial Length Avg</td><td>215.00</td><td>LF</td></tr> <tr><td>Initial Width Avg</td><td>23.00</td><td>LF</td></tr> </table>		Final Length Avg	195.00	LF	Final Width Avg	22.50	LF	Initial Length Avg	215.00	LF	Initial Width Avg	23.00	LF	<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>Final Length Avg</td><td>90.00</td><td>LF</td></tr> <tr><td>Final Width Avg</td><td>22.50</td><td>LF</td></tr> <tr><td>Initial Length Avg</td><td>210.00</td><td>LF</td></tr> <tr><td>Initial Width Avg</td><td>23.00</td><td>LF</td></tr> </table>		Final Length Avg	90.00	LF	Final Width Avg	22.50	LF	Initial Length Avg	210.00	LF	Initial Width Avg	23.00	LF	<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>Final Length Avg</td><td></td><td>LF</td></tr> <tr><td>Final Width Avg</td><td></td><td>LF</td></tr> <tr><td>Initial Length Avg</td><td></td><td>LF</td></tr> <tr><td>Initial Width Avg</td><td></td><td>LF</td></tr> </table>		Final Length Avg		LF	Final Width Avg		LF	Initial Length Avg		LF	Initial Width Avg		LF												
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Final SF		Final SF																																																			
Lineal Feet Trench		Lineal Feet Trench																																																			

Project Name: Nursery Products Job # 103004 Deployment Date 03/09/12

Superintendent: Vicente Figueroa Material Type: 60 mil HDPE

Primary  Secondary  Cell  Pond  Pad  Other: \_\_\_\_\_

Description (i.e. Phase #, Cell #, Pond # etc.)

Roll Stock Width 23

Panel #	Roll #	Final Length Avg	Final Width Avg	Initial Length Avg	Initial Width Avg	Initial SF	Final SF	Lineal Feet Trench
3	8468	97.00	22.50	107.00	23.00	2,461	2,183	22.5
4	6316	96.00	22.50	104.00	23.00	2,392	2,160	22.5
5	6316	191.00	22.50	211.00	23.00	4,853	4,298	45
6	6316	192.00	22.50	212.00	23.00	4,876	4,320	45
7	8469	192.00	22.50	212.00	23.00	4,876	4,320	45
8	8469	192.00	22.50	212.00	23.00	4,876	4,320	45
9	8469	96.00	22.50	106.00	23.00	2,438	2,160	22.5
10	8578	98.00	22.50	108.00	23.00	2,484	2,205	22.5
<b>Material in Anchor Trench</b>								
Total LF In Trench This Page							270.00	LF
Depth and Width Allowed in Trench							10	LF
Total SF Trench This Page							2,700	SF
Total Panel SF This Page							25,965	SF
Total Pay Area This Page							28,665	SF
LF In Trench Previous							90	LF
LF In Trench To Date							360	LF
SF In Trench Previous							900	SF
Total SF in Trench To Date							3,600	SF
Total Panel SF Previous							6,413	SF
Total Panel SF To Date							32,378	SF
Total Pay Area To Date Including Anchor Trench							35,978	
Initial Quantity Previous							9,775	SF
Initial Quantity This Page							29,256	SF
Initial Quantity To Date							39,031	SF

Project Name: Nursery Products Job # 103004 Deployment Date 03/09/12

Superintendent: Vicente Figueroa Material Type: 60 mil HDPE

Primary  Secondary  Cell  Pond  Pad  Other: \_\_\_\_\_

Description (i.e. Phase #, Coll #, Pond # etc.)

Roll Stock Width 23

Panel #	Roll #	Final Length Avg	Final Width Avg	Initial Length Avg	Initial Width Avg	Initial SF	Final SF	Lineal Feet Trench
11	8578	195.00	17.50	215.00	23.00	4,945	3,413	45
12	8578	14.50	22.50	38.00	23.00	874	326	23
13	8578	30.50	22.50	40.50	23.00	932	686	23
14	8578	34.00	22.50	44.00	23.00	1,012	765	23
15	8578	34.00	22.50	44.00	23.00	1,012	765	23
16	8572	35.00	22.50	45.00	23.00	1,035	788	23
17	8572	36.00	22.50	46.00	23.00	1,058	810	23
18	8572	36.00	22.50	46.00	23.00	1,058	810	23
<b>Material in Anchor Trench</b>								
Total LF In Trench This Page		206.00		LF				
Depth and Width Allowed in Trench		10		LF				
Total SF Trench This Page		2,060		SF				
Total Panel SF This Page		8,363		SF				
Total Pay Area This Page		10,423		SF				
LF In Trench Previous		360		LF				
LF In Trench To Date		566		LF				
SF In Trench Previous		3,600		SF				
Total SF in Trench to Date		5,660		SF				
Total Panel SF Previous		32,378		SF				
Total Panel SF To Date		40,740		SF				
Total Pay Area To Date Including Anchor Trench		46,400						
Initial Quantity Previous		39,031		SF				
Initial Quantity This Page		11,926		SF				
Initial Quantity To Date		50,957		SF				

ECApplications, Inc.  
Daily Panel Placement

Project Name: Nursery Products Job # 103004 Deployment Date 03/09/12

Superintendent: Vicente Figueroa Material Type: 60 mil HDPE

Primary  Secondary  Cell  Pond  Pad  Other: \_\_\_\_\_

Description (i.e. Phase #, Cell #, Pond # etc.)

Roll Stock Width 23

Panel #	Roll #	Panel #	Roll #	Panel #	Roll #
19	8572	20	8572		
	Final Length Avg 41.00 LF Final Width Avg 22.50 LF Initial Length Avg 51.00 LF Initial Width Avg 23.00 LF		Final Length Avg 19.00 LF Final Width Avg 22.50 LF Initial Length Avg 29.00 LF Initial Width Avg 23.00 LF		Final Length Avg _____ LF Final Width Avg _____ LF Initial Length Avg _____ LF Initial Width Avg _____ LF
Initial SF 1,173	Lineal Feet Trench 23	Initial SF 667	Lineal Feet Trench 35	Initial SF -	Lineal Feet Trench -
Final SF 923		Final SF 428		Final SF -	
Panel #	Roll #	Panel #	Roll #	Panel #	Roll #
	Final Length Avg _____ LF Final Width Avg _____ LF Initial Length Avg _____ LF Initial Width Avg _____ LF		Final Length Avg _____ LF Final Width Avg _____ LF Initial Length Avg _____ LF Initial Width Avg _____ LF		Final Length Avg _____ LF Final Width Avg _____ LF Initial Length Avg _____ LF Initial Width Avg _____ LF
Initial SF -	Lineal Feet Trench -	Initial SF -	Lineal Feet Trench -	Initial SF -	Lineal Feet Trench -
Final SF -		Final SF -		Final SF -	
Panel #	Roll #	Panel #	Roll #	Material In Anchor Trench	
	Final Length Avg _____ LF Final Width Avg _____ LF Initial Length Avg _____ LF Initial Width Avg _____ LF		Final Length Avg _____ LF Final Width Avg _____ LF Initial Length Avg _____ LF Initial Width Avg _____ LF	Total LF In Trench This Page	58.00 LF
Initial SF -	Lineal Feet Trench -	Initial SF -	Lineal Feet Trench -	Depth and Width Allowed in Trench	10 LF
Final SF -		Final SF -		Total SF Trench This Page	580 SF
				Total Panel SF This Page	1,350 SF
				Total Pay Area This Page	1,930 SF
				LF In Trench Previous	566 LF
				LF In Trench To Date	624 LF
				SF In Trench Previous	5,660 SF
				Total SF in Trench to Date	6,240 SF
				Total Panel SF Previous	40,740 SF
				Total Panel SF To Date	42,090 SF
				Total Pay Area To Date Including Anchor Trench	48,330
				Initial Quantity Previous	50.957 SF
				Initial Quantity This Page	1,840 SF
				Initial Quantity To Date	52,797 SF

Project Name: Nursery Products Job # 103004 Deployment Date 03/10/12

Superintendent: Vicente Figueroa Material Type: 60 mil HDPE

Primary  Secondary  Cell  Pond  Pad  Other: \_\_\_\_\_

Description (i.e. Phase #, Cell #, Pond # etc.)

Roll Stock Width 23

Panel #	Roll #	Panel #	Roll #	Panel #	Roll #																																													
21	8580	22	8580	23	8580																																													
<table border="1"> <tr><td>Final Length Avg</td><td>190.00</td><td>LF</td></tr> <tr><td>Final Width Avg</td><td>22.50</td><td>LF</td></tr> <tr><td>Initial Length Avg</td><td>209.00</td><td>LF</td></tr> <tr><td>Initial Width Avg</td><td>23.00</td><td>LF</td></tr> </table>		Final Length Avg	190.00	LF	Final Width Avg	22.50	LF	Initial Length Avg	209.00	LF	Initial Width Avg	23.00	LF	<table border="1"> <tr><td>Final Length Avg</td><td>190.00</td><td>LF</td></tr> <tr><td>Final Width Avg</td><td>22.50</td><td>LF</td></tr> <tr><td>Initial Length Avg</td><td>210.00</td><td>LF</td></tr> <tr><td>Initial Width Avg</td><td>23.00</td><td>LF</td></tr> </table>		Final Length Avg	190.00	LF	Final Width Avg	22.50	LF	Initial Length Avg	210.00	LF	Initial Width Avg	23.00	LF	<table border="1"> <tr><td>Final Length Avg</td><td>95.00</td><td>LF</td></tr> <tr><td>Final Width Avg</td><td>22.50</td><td>LF</td></tr> <tr><td>Initial Length Avg</td><td>105.00</td><td>LF</td></tr> <tr><td>Initial Width Avg</td><td>23.00</td><td>LF</td></tr> </table>		Final Length Avg	95.00	LF	Final Width Avg	22.50	LF	Initial Length Avg	105.00	LF	Initial Width Avg	23.00	LF									
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Final Width Avg	22.50	LF																																																
Initial Length Avg	105.00	LF																																																
Initial Width Avg	23.00	LF																																																
Initial SF 4,807		Initial SF 4,830		Initial SF 2,415																																														
Final SF 4,275		Final SF 4,275		Final SF 2,138																																														
Lineal Feet Trench 45		Lineal Feet Trench 45		Lineal Feet Trench 22.5																																														
24	8470	25	8470																																															
<table border="1"> <tr><td>Final Length Avg</td><td>94.00</td><td>LF</td></tr> <tr><td>Final Width Avg</td><td>22.50</td><td>LF</td></tr> <tr><td>Initial Length Avg</td><td>104.00</td><td>LF</td></tr> <tr><td>Initial Width Avg</td><td>23.00</td><td>LF</td></tr> </table>		Final Length Avg	94.00	LF	Final Width Avg	22.50	LF	Initial Length Avg	104.00	LF	Initial Width Avg	23.00	LF	<table border="1"> <tr><td>Final Length Avg</td><td>199.00</td><td>LF</td></tr> <tr><td>Final Width Avg</td><td>22.50</td><td>LF</td></tr> <tr><td>Initial Length Avg</td><td>209.00</td><td>LF</td></tr> <tr><td>Initial Width Avg</td><td>23.00</td><td>LF</td></tr> </table>		Final Length Avg	199.00	LF	Final Width Avg	22.50	LF	Initial Length Avg	209.00	LF	Initial Width Avg	23.00	LF	<table border="1"> <tr><td>Final Length Avg</td><td></td><td>LF</td></tr> <tr><td>Final Width Avg</td><td></td><td>LF</td></tr> <tr><td>Initial Length Avg</td><td></td><td>LF</td></tr> <tr><td>Initial Width Avg</td><td></td><td>LF</td></tr> </table>		Final Length Avg		LF	Final Width Avg		LF	Initial Length Avg		LF	Initial Width Avg		LF									
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Final SF 2,115		Final SF 4,478		Final SF																																														
Lineal Feet Trench 22.5		Lineal Feet Trench 45		Lineal Feet Trench																																														
				Material In Anchor Trench																																														
				<table border="1"> <tr><td>Total LF In Trench This Page</td><td>180.00</td><td>LF</td></tr> <tr><td>Depth and Width Allowed in Trench</td><td>10</td><td>LF</td></tr> <tr><td>Total SF Trench This Page</td><td>1,800</td><td>SF</td></tr> <tr><td>Total Panel SF This Page</td><td>17,280</td><td>SF</td></tr> <tr><td>Total Pay Area This Page</td><td>19,080</td><td>SF</td></tr> <tr><td>LF In Trench Previous</td><td>624</td><td>LF</td></tr> <tr><td>LF In Trench To Date</td><td>804</td><td>LF</td></tr> <tr><td>SF In Trench Previous</td><td>6,240</td><td>SF</td></tr> <tr><td>Total SF in Trench to Date</td><td>8,040</td><td>SF</td></tr> <tr><td>Total Panel SF Previous</td><td>42,090</td><td>SF</td></tr> <tr><td>Total Panel SF To Date</td><td>59,370</td><td>SF</td></tr> <tr><td>Total Pay Area To Date Including Anchor Trench</td><td>67,410</td><td></td></tr> <tr><td>Initial Quantity Previous</td><td>52,797</td><td>SF</td></tr> <tr><td>Initial Quantity This Page</td><td>19,251</td><td>SF</td></tr> <tr><td>Initial Quantity To Date</td><td>72,048</td><td>SF</td></tr> </table>		Total LF In Trench This Page	180.00	LF	Depth and Width Allowed in Trench	10	LF	Total SF Trench This Page	1,800	SF	Total Panel SF This Page	17,280	SF	Total Pay Area This Page	19,080	SF	LF In Trench Previous	624	LF	LF In Trench To Date	804	LF	SF In Trench Previous	6,240	SF	Total SF in Trench to Date	8,040	SF	Total Panel SF Previous	42,090	SF	Total Panel SF To Date	59,370	SF	Total Pay Area To Date Including Anchor Trench	67,410		Initial Quantity Previous	52,797	SF	Initial Quantity This Page	19,251	SF	Initial Quantity To Date	72,048	SF
Total LF In Trench This Page	180.00	LF																																																
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Initial SF		Initial SF		Initial SF																																														
Final SF		Final SF		Final SF																																														
Lineal Feet Trench		Lineal Feet Trench		Lineal Feet Trench																																														

Project Name: Nursery Products Job # 103004 Deployment Date 03/12/12

Superintendent: Vicente Figueroa Material Type: 60 mil HDPE

Primary  Secondary  Cell  Pond  Pad  Other: \_\_\_\_\_

Description (i.e. Phase #, Cell #, Pond # etc.)

Roll Stock Width 23

Panel #	Roll #	Final Length Avg	Final Width Avg	Initial Length Avg	Initial Width Avg	Initial SF	Final SF	Lineal Feet Trench
26	8470	129.00	22.50	139.00	23.00	3,197	2,903	22.5
27	8571	190.00	22.50	210.00	23.00	4,830	4,275	45
28	8571	190.00	22.50	210.00	23.00	4,830	4,275	45
29	8571	96.00	22.50	106.00	23.00	2,438	2,160	22.5
30	8572	94.00	22.50	104.00	23.00	2,392	2,115	22.5
31	8467	30.50	22.50	40.50	23.00	932	686	22.5
32	8467					225	120	20
33	8467					280	144	20
<b>Material in Anchor Trench</b>								
Total LF in Trench This Page		220.00		LF				
Depth and Width Allowed in Trench		10		LF				
Total SF Trench This Page		2,200		SF				
Total Panel SF This Page		16,678		SF				
Total Pay Area This Page		18,878		SF				
LF in Trench Previous		804		LF				
LF in Trench To Date		1,024		LF				
SF in Trench Previous		8,040		SF				
Total SF in Trench to Date		10,240		SF				
Total Panel SF Previous		59,370		SF				
Total Panel SF To Date		76,048		SF				
Total Pay Area To Date Including Anchor Trench		86,288		SF				
Initial Quantity Previous		72,048		SF				
Initial Quantity This Page		19,124		SF				
Initial Quantity To Date		91,171		SF				

Project Name: NURSERY PRODUCTS Job # 103004 Deployment Date \_\_\_\_\_

Superintendent: Vicente Figueroa Material Type: 60 Mil HDPE

Primary  Secondary  Cell  Pond  Pad  Other: \_\_\_\_\_

Description (i.e. Phase #, Cell #, Pond # etc.)

Roll Stock Width

Panel #	Roll #	Final Length Avg	Final Width Avg	Initial Length Avg	Initial Width Avg	Initial SF	Final SF	Lineal Feet Trench
34	8467	30.50	22.50	40.50	23.00	932	686	22.5
35	8467	43.00	22.75	53.00	22.75	1,206	978	22.5
36	8467	43.00	22.50	53.00	23.00	1,219	968	22.5
37	8467	42.00	22.50	52.00	23.00	1,196	945	22.5
38	8467	40.00	22.50	50.00	23.00	1,150	900	22.5
39	8467	37.00	22.50	47.00	23.00	1,081	833	22.5
40	8467	61.00	22.50	71.00	23.00	1,633	1,373	22.5
41	8577	32.00	22.50	42.00	23.00	966	720	22.5
<b>Material in Anchor Trench</b>								
Total LF In Trench This Page		180.00		LF				
Depth and Width Allowed in Trench		10		LF				
Total SF Trench This Page		1,800		SF				
Total Panel SF This Page		7402		SF				
Total Pay Area This Page		724		SF				
LF In Trench Previous		824		LF				
LF In Trench To Date		988		LF				
SF In Trench Previous				SF				
Total SF in Trench to Date				SF				
Total Panel SF Previous				SF				
Total Panel SF To Date				SF				
Total Pay Area To Date Including Anchor Trench				SF				
Initial Quantity Previous		91,171		SF				
Initial Quantity This Page		9387		SF				
Initial Quantity To Date		100,557		SF				

Project Name: NURSERY PRODUCTS Job # 103004 Page 8  
Deployment Date \_\_\_\_\_

Superintendent: Vicente Figueroa Material Type: 60 Mil HDPE  
 Primary  Secondary  Cell  Pond  Pad  Other: \_\_\_\_\_

Description (i.e. Phase #, Cell #, Pond # etc.) \_\_\_\_\_

Panel #		Roll #		Roll Stock Width	
42	8577	Final Length Avg	27 00	LF	
		Final Width Avg	22 50	LF	
		Initial Length Avg	37 00	LF	
		Initial Width Avg	23 00	LF	
		Notes			
Initial SF	851	Lineal Feet Trench			
Final SF	608	22 5			
43		Final Length Avg		LF	
		Final Width Avg		LF	
		Initial Length Avg		LF	
		Initial Width Avg		LF	
		Notes			
Initial SF		Lineal Feet Trench			
Final SF					
43B		Final Length Avg		LF	
		Final Width Avg		LF	
		Initial Length Avg	215.00	LF	
		Initial Width Avg		LF	
		Notes			
Initial SF		Lineal Feet Trench			
Final SF					
<b>Material in Anchor Trench</b>					
Total LF In Trench This Page		22 50		LF	
Depth and Width Allowed in Trench		10		LF	
Total SF Trench This Page		225		SF	
Total Panel SF This Page				SF	
Total Pay Area This Page				SF	
LF In Trench Previous				LF	
LF In Trench To Date				LF	
SF In Trench Previous				SF	
Total SF in Trench to Date				SF	
Total Panel SF Previous				SF	
Total Panel SF To Date				SF	
Total Pay Area To Date Including Anchor Trench				SF	
Initial Quantity Previous		100,553		SF	
Initial Quantity This Page		851		SF	
Initial Quantity To Date		101,404		SF	

# EC Applications Inc.

## Repair Report

Project Name: Nursery Products Job #: 103004 Superintendent: Vicente Figueroa  
 Material Type: 60 mil HDPE Primary:  Pond:   
 Job Description: vicior rodriguez Secondary:  Cell:  Pad:   
 Reported by: vicior rodriguez Other:

Damage Codes		SF Patch Material		Test Type		Repair Types	
CR - Crease	FS - Failed Seam	391	391	Vacuum	*S=South	C Cap Strip	
DS - Debris Sample	WR - Wrinkle	LF Welded	594.00	Air Pressure	*N=North	P - Patch	
SI - Subgrade Irregularity	AV - Avenal	Air Lance		Spark	*W=West	B - Extrusion Bead	
SJ - Seam Joint	AO - Add On				*E=East		

Repair Number	Damage Code	Seam Number	Panel Number	Location	Repair Type	Patch (Feet)	Bead (Inches)	Date Welded	Operator Name	Machine Number	Test Type	Abbrev.	Test Results	Date Complete
1	SJ	1-12-13		From Anchor Trench	P	3 x 2		3/10/12	Roque Martinez	102	Vacuum		Pass	3/10/12
2	WR	1-13		From Anchor Trench	P	2 x 2		3/10/12	Roque Martinez	102	Vacuum		Pass	3/10/12
3	SJ	1-13-14		From Anchor Trench	P	2 x 2		3/10/12	Roque Martinez	102	Vacuum		Pass	3/10/12
4	DS#5	14-15		From Anchor Trench	P	8 x 2		3/10/12	Roque Martinez	102	Vacuum		Pass	3/10/12
5	SJ	1-15-16		From Anchor Trench	P	2 x 2		3/10/12	Roque Martinez	102	Vacuum		Pass	3/10/12
6	SJ	1-16-17		From Anchor Trench	P	2 x 2		3/10/12	Roque Martinez	102	Vacuum		Pass	3/10/12
7	SJ	1-17-18		From Anchor Trench	P	3 x 2		3/10/12	Roque Martinez	102	Vacuum		Pass	3/10/12
8	DS#6	1-18		From Anchor Trench	P	8 x 2		3/10/12	Roque Martinez	102	Vacuum		Pass	3/10/12
9	WR	1-19		From Anchor Trench	P	6 x 2		3/10/12	Roque Martinez	102	Vacuum		Pass	3/10/12
10	SJ	18-19-20		From Anchor Trench	P	2 x 2		3/10/12	Roque Martinez	102	Vacuum		Pass	3/10/12
11	SJ	11-10-9		From Anchor Trench	P	2 x 2		3/10/12	Roque Martinez	102	Vacuum		Pass	3/10/12
12	DS#3	8-10		From Anchor Trench	P	8 x 2		3/10/12	Roque Martinez	102	Vacuum		Pass	3/10/12
13	MD		11	From Anchor Trench	B		6	3/10/12	Roque Martinez	102	Vacuum		Pass	3/10/12
14	DS#4	1-1		From Anchor Trench	P	6 x 2		3/10/12	Roque Martinez	102	Vacuum		Pass	3/10/12
15	BO	10-11		From Anchor Trench	P	4 x 2		3/10/12	Roque Martinez	102	Vacuum		Pass	3/10/12
16	WS	9-1		From Anchor Trench	B		6	3/10/12	Roque Martinez	102	Vacuum		Pass	3/10/12
17	DS#2	5-6		From Anchor Trench	P	6 x 2		3/10/12	Roque Martinez	102	Vacuum		Pass	3/10/12
18	SJ	3-4-5		From Anchor Trench	P	3 x 2		3/10/12	Roque Martinez	102	Vacuum		Pass	3/10/12
19	SJ	234		From Anchor Trench	P	4 x 2		3/10/12	Roque Martinez	102	Vacuum		Pass	3/10/12
20	DO		4	From Anchor Trench	P	1 x 1		3/10/12	Roque Martinez	102	Vacuum		Pass	3/10/12
21	BO	4-5		From Anchor Trench	P	2 x 2		3/10/12	Roque Martinez	102	Vacuum		Pass	3/10/12

# EC Applications Inc.

## Repair Report

Project Name: Nursery Products Job #: 103004 Superintendent: Vicente Figueroa  
 Material Type: 80 mil HDPE Primary:  Pond:   
 Job Description: Victor Rodriguez Secondary:  Cell:  Pad:   
 Reported by: Victor Rodriguez Other:

CR - Craze		FS - Failed Seam		Maid - Material Defect		LL - Last Lap		CF - Custom Fit	
DS - Distort; Sample		WR - Wrinkle		WS - Welder Restart		MD - Mechanical Damage		PB - Pipe Boot	
SI - Subgrade Irregularity		AV - Airtent		RW - Roller Whistle		DO - Damage By Others		BO - Burn Out	
S <sub>u</sub> - Seam Joint		AO - Add On		CS - Concrete Structure		AI - Air Test			

Repair Number	Damage Code	Seam Number	Panel Number	Location	Repair Type	Patch (Feet)		Bead (Inches)	Date Welded	Operator Name	Machine Number	Test Type	Abbrev.	Repair Types	Test Results	Date Complete
						Length	Width									
22	DS#1	2-4	2	3N From Anchor Trench	P	5	2		3/10/12	Roque Martinez	102	Vacuum	*S=South	C-Cap Strip	Pass	3/10/12
23	MID			16N 2W From Anchor Trench	P	1	1		3/10/12	Roque Martinez	102	Vacuum	*N=North	P-Patch	Pass	3/10/12
24	WR	2-21		30N From Anchor Trench	P	3	2		3/10/12	Roque Martinez	102	Vacuum	*W=West	B-Extrusion Bead	Pass	3/10/12
25	WR	2-21		180N From Anchor Trench	P	5	2		3/10/12	Roque Martinez	102	Vacuum			Pass	3/10/12
26	BO	21-22		200N From Anchor Trench	P	2	2		3/10/12	Roque Martinez	102	Vacuum			Pass	3/10/12
27	WS	23-25		200N From Anchor Trench	B			6	3/10/12	Roque Martinez	102	Vacuum			Pass	3/10/12
28	BO	23-25		150N From Anchor Trench	P	4	2		3/10/12	Roque Martinez	102	Vacuum			Pass	3/10/12
29	SJ	23-24,25		104N 3W From Anchor Trench	P	4	2		3/10/12	Roque Martinez	102	Vacuum			Pass	3/10/12
30	SJ	22-23,24		104N 3W From Anchor Trench	P	2	2		3/10/12	Roque Martinez	102	Vacuum			Pass	3/10/12
31	MD		23	100N 3E From Anchor Trench	P	2	2		3/10/12	Roque Martinez	102	Vacuum			Pass	3/10/12
32	BO	22-24		45N From Anchor Trench	P	2	2		3/10/12	Roque Martinez	102	Vacuum			Pass	3/10/12
33	WS	22-24		10N From Anchor Trench	P	1	1		3/10/12	Roque Martinez	102	Vacuum			Pass	3/10/12
34	WS	27-28		8N From Anchor Trench	B			6	3/12/12	Roque Martinez	102	Vacuum			Pass	3/12/12
35	DS#10	28-30		2N From Anchor Trench	P	8	2		3/12/12	Roque Martinez	102	Vacuum			Pass	3/12/12
36	DS#7	21-2		206N From Anchor Trench	P	6	2		3/12/12	Roque Martinez	102	Vacuum			Pass	3/12/12
37	DS#9	27-28		2S From Anchor Trench	P	6	2		3/12/12	Roque Martinez	102	Vacuum			Pass	3/12/12
38	BO	28-29		10S From Anchor Trench	P	6	2		3/12/12	Roque Martinez	102	Vacuum			Pass	3/12/12
39	SJ	28-29,30		104N From Anchor Trench	P	3	2		3/12/12	Roque Martinez	102	Vacuum			Pass	3/12/12
40	SJ	26-29,30		104N From Anchor Trench	P	3	2		3/12/12	Roque Martinez	102	Vacuum			Pass	3/12/12
41	SJ	1-32,33,34		From Anchor Trench	P	4	2		3/12/12	Roque Martinez	102	Vacuum			Pass	3/12/12
42	WF	25-31		From Anchor Trench	P	2	2		3/12/12	Roque Martinez	102	Vacuum			Pass	3/12/12

SF Patch Material: 391  
 LF Welded: 594.00

# EC Applications Inc. Repair Report

Project Name: Nursery Products Job #: 103004 Superintendent: Vicente Figueroa  
 Material Type: 80 mil HDPE Primary:  Pond:   
 Job Description: victor rodriguez Secondary:  Cell:   
 Reported by: victor rodriguez Other:  Pad:

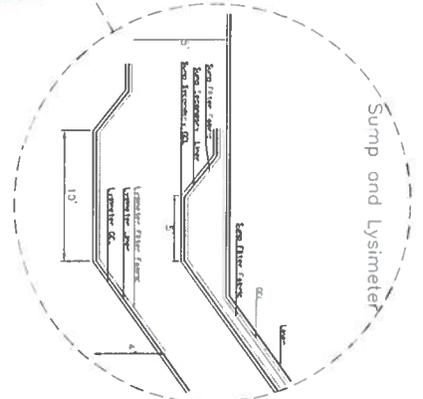
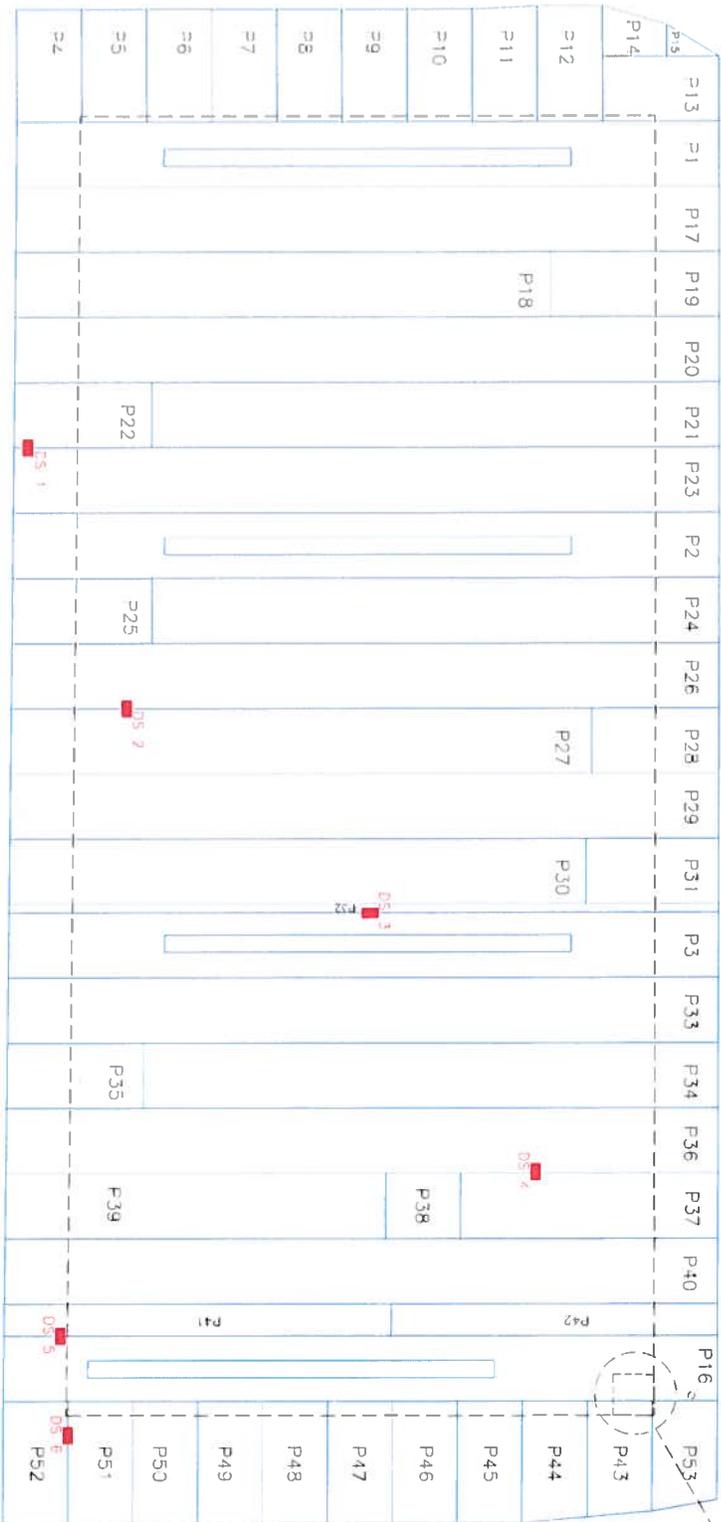
Repair Number	Damage Code	Seam Number	Panel Number	Location	Repair Type	Patch		Bead (Inches)	Date Welded	Operator Name	Machine Number	Test Type	Abbrev.	Repair Types	Date Complete
						(feet)	(Inches)								
43	SJ	26-34-35		From Anchor Trench	P	4	4		3/12/12	Roque Martinez	102	Vacuum	*S=South *N=North *W=West *E=East	C Cap Strip P Patch B Extrusion Bead	3/12/12
44	SJ	26-35-36		From Anchor Trench	P	2	2		3/12/12	Roque Martinez	102	Vacuum			3/12/12
45	SJ	26-36-37		From Anchor Trench	P	2	2		3/12/12	Roque Martinez	102	Vacuum			3/12/12
46	SJ	26-37-38		From Anchor Trench	P	2	2		3/13/12	Roque Martinez	102	Vacuum			3/13/12
47	SJ	26-38-40		From Anchor Trench	P	5	2		3/13/12	Roque Martinez	102	Vacuum			3/13/12
48	BO	26-40		From Anchor Trench	P	2	2		3/13/12	Roque Martinez	102	Vacuum			3/13/12
49	SJ	26-29-40		From Anchor Trench	P	4	2		3/13/12	Roque Martinez	102	Vacuum			3/13/12
50	SJ	38-39-40		From Anchor Trench	P	2	2		3/13/12	Roque Martinez	102	Vacuum			3/13/12
51	SJ	39-40-41		From Anchor Trench	P	3	2		3/13/12	Roque Martinez	102	Vacuum			3/13/12
52	SJ	40-41-42		From Anchor Trench	P	2	2		3/13/12	Roque Martinez	102	Vacuum			3/13/12
53	DS#11	38-39		From Anchor Trench	P	6	2		3/13/12	Roque Martinez	102	Vacuum			3/13/12
54	BO	38-39		From Anchor Trench	P	4	2		3/13/12	Roque Martinez	102	Vacuum			3/13/12
55	DS#12	40-42		From Anchor Trench	P	6	2		3/13/12	Roque Martinez	102	Vacuum			3/13/12
56	DS#8	24-25		From Anchor Trench	P	6	2		3/13/12	Roque Martinez	102	Vacuum			3/13/12
57															
58															
59															
60															
61															
62															
63															

**Damage Codes**  
 CR - Crease      F-S - Failed Seam      MLD - Material Defect      LT - Lost Lap      CF - Custom Fit  
 DS - Destructive Sample      WR - Wrinkle      WS - Welder Resum      MD - Mechanical Damage      PG - Pipe Boot  
 SJ - Subgrade Irregularity      AV - Airtight      RW - Roller Wrinkle      DO - Damage By Others      BO - Burn Out  
 SJ - Seam Joint      AO - Add On      CS - Concrete Structure      AT - Air Test

**SF Patch Material**  
 391  
 LF Welded 594.00  
 Test Type: Vacuum Air Pressure Spark Air Lance  
 Repair Types: \*S=South, \*N=North, \*W=West, \*E=East

## Surface Impoundment B





REVISIONS/NOTES

1	Panel Numbers
2	Destructive Samples
3	Spouts larger than the destructive samples
4	Grid Perfection Boat
5	Spout

Nursery Products - Hawes  
Composting Facility

Retention Basin B  
Geomembrane  
As-Built

60 mil HDPE  
Smooth Liner

**ECApplications**

650 N. Balboa Street  
ORANGE, CA 92668  
TEL: (714) 971-1225  
FAX: (866) 475-1225  
www.ecapplications.com

DATE: 1/17/2013  
DRAWN BY: [Name]  
CHECKED BY: [Name]  
SCALE: 1"=100'  
PROJECT: Nursery Products  
SHEET NO: 1

**ECApplications, Inc.  
Preweld Test Report**

Project Name: Nursery Products Hawes Composting Job Number: 103004

Material Type: GCL and 60 Mil HDPE Liner Primary  Secondary  Other

Job Description: Juan Delgado Superintendent: B

Peel Test Extrusion Minimum 78 ppi  
 Peel Test Fusion Minimum 91 ppi  
 Shear Test Minimum 120 ppi

Weld Date Liner Type	Time am   pm	Operator Name/ID	Mach No.	Mach Speed	Mach Temp	Preheat Temp	Ambient Temp	Coupon 1		Coupon 2		Coupon 3		Coupon 4		Coupon 5		Test Results
								A	B	A	B	A	B	A	B	A	B	
4/17/12	2:04	Librado Dominguez	74	4.5	750			127	121	120	122	126	119	120	115	119	118	P
S TO S	PM							141	138	138	139	139	132	125	123	127	113	
4/18/12	9:00	Emilio Gutierrez	59	4.5	700			126	133	126	130	119	122	125	123	127	113	P
S TO S	am							159	144	160	160	151	162					
4/18/12	9:00	Joel Dominguez	53	4	750			133	135	122	134	131	145	129	130	143	132	P
S TO S	AM							136	146	152	152	145	149					
4/18/12	9:065	Librado Dominguez	74	4.5	750			120	117	121	140	110	96	108	99	111	116	P
S TO S	AM							151	145	158	158	142	154					
4/18/12	12:00	Mario Gonzalez	102		480	480		102	102	112	112	116	111	111	111			P
S TO S	PM							124	126	125	125	126	130					
4/19/12	7:52	Librado Dominguez	74	4.5	750			125	140	117	128	123	124	126	128	129	133	P
S TO S	AM							127	128	131	131	129	131					
4/19/12	8:00	Joel Dominguez	53	4	750			138	110	109	122	121	101	130	134	135	131	P
S TO S	AM							148	149	164	164	152	163					
4/19/12	8:00	Emilio Gutierrez	59	4.5	700			126	122	127	126	136	124	137	118	121	131	P
S TO S	AM							155	147	154	154	142	148					
4/23/12	6:54	Librado Dominguez	74	4	750			117	120	116	121	120	119	111	115	119	113	P
TO	AM							153	134	142	142	146	146					
4/23/12	7:36	Emilio Gutierrez	59	4.5	700			113	131	120	115	129	147	115	120	127	129	P
TO	AM							156	139	155	155	137	155					
4/23/12	9:00	Joel Dominguez	53	4	750			146	118	123	112	129	134	103	136	135	123	P
S TO	AM							154	146	152	152	149	151					
4/23/12	9:10	Raymundo Bailong	102		470	375		120	121	118	118	120	120	130	130			P
S TO	AM							196	182	178	178	190	183					
4/23/12	10:46	Librado Dominguez	104		450	380		123	129	115	115	121	125	125	125			P
S TO S	AM							190	185	168	168	196	170					
4/23/12	12:40	Raymundo Bailong	102		470	390		117	104	111	111	104	120	120	126			P
S TO S	PM							134	124	121	121	123	123					
4/30/12	11:20	Emilio Gutierrez	59	4	700			116	111	108	107	115	118	103	103	114	113	P
S TO S	AM							120	120	121	121	121	120	120	120	120	120	
4/30/12	1:00	Alejandro Flores	74	5	750			122	112	118	109	118	110	117	125	120	123	P
S TO S	PM							133	123	129	129	130	133					
4/30/12	1:00	Joel Dominguez	102		450	380		110	112	112	112	118	118	120	124			P
S TO S	PM							125	127	130	130	127	127					



**ECApplications, Inc.**  
Daily Panel Placement

Project Name: Nursery Products Job # 103004 Deployment Date \_\_\_\_\_

Superintendent: Vicente Figueroa Material Type: 60 Mil HDPE Liner

Primary     Secondary     Cell     Pond  Pad     Other: \_\_\_\_\_

Description (i.e. Phase #, Cell #, Pond # etc.)

Roll Stock Width

Panel #	Roll #	Roll #	Panel #	Roll #	Panel #	Roll #																																																
1	6314	6314	2	6314	3	8466																																																
<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>Final Length Avg</td><td>239.00</td><td>LF</td></tr> <tr><td>Final Width Avg</td><td>22.50</td><td>LF</td></tr> <tr><td>Initial Length Avg</td><td>248.00</td><td>LF</td></tr> <tr><td>Initial Width Avg</td><td>23.00</td><td>LF</td></tr> </table>		Final Length Avg	239.00	LF	Final Width Avg	22.50	LF	Initial Length Avg	248.00	LF	Initial Width Avg	23.00	LF	<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>Final Length Avg</td><td>241.00</td><td>LF</td></tr> <tr><td>Final Width Avg</td><td>22.50</td><td>LF</td></tr> <tr><td>Initial Length Avg</td><td>249.00</td><td>LF</td></tr> <tr><td>Initial Width Avg</td><td>23.00</td><td>LF</td></tr> </table>		Final Length Avg	241.00	LF	Final Width Avg	22.50	LF	Initial Length Avg	249.00	LF	Initial Width Avg	23.00	LF	<table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>Final Length Avg</td><td>241.00</td><td>LF</td></tr> <tr><td>Final Width Avg</td><td>22.50</td><td>LF</td></tr> <tr><td>Initial Length Avg</td><td>248.00</td><td>LF</td></tr> <tr><td>Initial Width Avg</td><td>23.00</td><td>LF</td></tr> </table>		Final Length Avg	241.00	LF	Final Width Avg	22.50	LF	Initial Length Avg	248.00	LF	Initial Width Avg	23.00	LF													
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Lineal Feet Trench 22.5		Lineal Feet Trench 22.5																																																				

**ECApplications, Inc.**  
Daily Panel Placement

Project Name: Nursery Products Job # 103004 Deployment Date 09/08/09

Superintendent: Vicente Figueroa Material Type: 60 Mil HDPE Liner

Primary     Secondary     Cell     Pond  Pad     Other: \_\_\_\_\_

Description (i.e. Phase #, Cell #, Pond # etc.)

Roll Stock Width

Panel #	Roll #	Panel #	Roll #	Panel #	Roll #																																																
9	8573	10	8573	11	8573																																																
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Initial Quantity To Date	33,200	SF																																																			
Final Length Avg		Final Length Avg	244.00																																																		
Final Width Avg		Final Width Avg	22.50																																																		
Initial Length Avg		Initial Length Avg	250.00																																																		
Initial Width Avg		Initial Width Avg	23.00																																																		
7		23																																																			
7		22.5																																																			
11	7	250	244																																																		
8		244																																																			
22.5		22.5																																																			
23		23																																																			
Initial SF	39	Initial SF	5,750																																																		
Final SF	28	Final SF	5,490																																																		
Lineal Feet Trench		Lineal Feet Trench																																																			
	3		45																																																		

**ECApplications, Inc.**  
Daily Panel Placement

Project Name: Nursery Products Job # 103004 Deployment Date \_\_\_\_\_

Superintendent: Vicente Figueroa Material Type: 60 Mil HDPE Liner

Primary  Secondary  Cell  Pond  B  Pad  Other: \_\_\_\_\_

Description (i.e. Phase #, Cell #, Pond # etc.) \_\_\_\_\_

Roll Stock Width \_\_\_\_\_

Panel #	Roll #	Panel #	Roll #	Panel #	Roll #	Material in Anchor Trench	
17	8577	18	8577	19	8579	Total LF In Trench This Page	225.00 LF
Final Length Avg	239.00 LF	Final Length Avg	176.00 LF	Final Length Avg	58.00 LF	Depth and Width Allowed in Trench	3 LF
Final Width Avg	22.50 LF	Final Width Avg	22.50 LF	Final Width Avg	22.50 LF	Total SF Trench This Page	675 SF
Initial Length Avg	248.00 LF	Initial Length Avg	180.00 LF	Initial Length Avg	62.00 LF	Total Panel SF This Page	26,618 SF
Initial Width Avg	23.00 LF	Initial Width Avg	23.00 LF	Initial Width Avg	23.00 LF	Total Pay Area This Page	27,293 SF
23	23	23	23	23	23	LF In Trench Previous	457 LF
22.5	22.5	22.5	22.5	22.5	22.5	LF In Trench To Date	682 LF
248	239	180	176	62	58	SF In Trench Previous	1,370 SF
239	239	176	176	58	58	Total SF in Trench to Date	2,045 SF
248	248	180	180	62	62	Total Panel SF Previous	30,442 SF
Notes:	Notes:	Notes:	Notes:	Notes:	Notes:	Total Panel SF To Date	57,059 SF
Initial SF	5,704	Initial SF	4,140	Initial SF	1,426	Total Pay Area To Date Including Anchor Trench	59,104
Final SF	5,378	Final SF	3,960	Final SF	1,305	Initial Quantity Previous	33,200 SF
Lineal Feet Trench	45	Lineal Feet Trench	22.5	Lineal Feet Trench	22.5	Initial Quantity This Page	28,267 SF
						Initial Quantity To Date	61,467 SF
20	8579	21	8579	22	8574		
Final Length Avg	239.00 LF	Final Length Avg	196.00 LF	Final Length Avg	38.00 LF		
Final Width Avg	22.50 LF	Final Width Avg	22.50 LF	Final Width Avg	22.50 LF		
Initial Length Avg	249.00 LF	Initial Length Avg	200.00 LF	Initial Length Avg	42.00 LF		
Initial Width Avg	23.00 LF	Initial Width Avg	23.00 LF	Initial Width Avg	23.00 LF		
23	23	23	23	23	23		
22.5	22.5	22.5	22.5	22.5	22.5		
249	239	200	196	42	38		
239	239	196	196	38	38		
249	249	200	200	42	42		
Notes:	Notes:	Notes:	Notes:	Notes:	Notes:		
Initial SF	5,727	Initial SF	4,600	Initial SF	966		
Final SF	5,378	Final SF	4,410	Final SF	855		
Lineal Feet Trench	45	Lineal Feet Trench	22.5	Lineal Feet Trench	22.5		
23	8574						
Final Length Avg	237.00 LF	Final Length Avg					
Final Width Avg	22.50 LF	Final Width Avg					
Initial Length Avg	248.00 LF	Initial Length Avg					
Initial Width Avg	23.00 LF	Initial Width Avg					
23	23						
22.5	22.5						
248	237						
237	237						
248	248						
Notes:	Notes:						
Initial SF	5,704	Initial SF	-				
Final SF	5,333	Final SF	-				
Lineal Feet Trench	45	Lineal Feet Trench					

Project Name: Nursery Products Job # 103004 Deployment Date \_\_\_\_\_

Superintendent: Vicente Figueroa Material Type: 60 Mil HDPE Liner

Primary  Secondary  Cell  Pond  **B**  Pad  Other: \_\_\_\_\_

Description (i.e. Phase #, Cell #, Pond # etc.)

Roll Stock Width

Panel #	Roll #	Panel #	Roll #	Panel #	Roll #																																																
24	8574	25	6313	26	6313																																																
Final Length Avg: 196.00 LF Final Width Avg: 22.50 LF Initial Length Avg: 200.00 LF Initial Width Avg: 23.00 LF		Final Length Avg: 42.00 LF Final Width Avg: 22.50 LF Initial Length Avg: 46.00 LF Initial Width Avg: 23.00 LF		Final Length Avg: 236.00 LF Final Width Avg: 22.50 LF Initial Length Avg: 245.00 LF Initial Width Avg: 23.00 LF																																																	
Notes:		Notes:		Notes:																																																	
Initial SF: 4,600		Initial SF: 1,058		Initial SF: 5,635																																																	
Final SF: 4,410		Final SF: 945		Final SF: 5,310																																																	
Lineal Feet Trench: 22.5		Lineal Feet Trench: 22.5		Lineal Feet Trench: 45																																																	
27	6313	28	8575	29	8575																																																
Final Length Avg: 196.00 LF Final Width Avg: 22.50 LF Initial Length Avg: 200.00 LF Initial Width Avg: 23.00 LF		Final Length Avg: 44.00 LF Final Width Avg: 22.50 LF Initial Length Avg: 49.00 LF Initial Width Avg: 23.00 LF		Final Length Avg: 240.00 LF Final Width Avg: 22.50 LF Initial Length Avg: 249.00 LF Initial Width Avg: 23.00 LF																																																	
Notes:		Notes:		Notes:																																																	
Initial SF: 4,600		Initial SF: 1,127		Initial SF: 5,727																																																	
Final SF: 4,410		Final SF: 990		Final SF: 5,400																																																	
Lineal Feet Trench: 22.5		Lineal Feet Trench: 22.5		Lineal Feet Trench: 45																																																	
30	8575	31	6317	<table border="1"> <thead> <tr> <th colspan="3">Material in Anchor Trench</th> </tr> </thead> <tbody> <tr> <td>Total LF In Trench This Page</td> <td>225.00</td> <td>LF</td> </tr> <tr> <td>Depth and Width Allowed in Trench</td> <td>3</td> <td>LF</td> </tr> <tr> <td>Total SF Trench This Page</td> <td>675</td> <td>SF</td> </tr> <tr> <td>Total Panel SF This Page</td> <td>26,865</td> <td>SF</td> </tr> <tr> <td>Total Pay Area This Page</td> <td>27,540</td> <td>SF</td> </tr> <tr> <td>LF In Trench Previous</td> <td>682</td> <td>LF</td> </tr> <tr> <td>LF In Trench To Date</td> <td>907</td> <td>LF</td> </tr> <tr> <td>SF In Trench Previous</td> <td>2,045</td> <td>SF</td> </tr> <tr> <td>Total SF in Trench to Date</td> <td>2,720</td> <td>SF</td> </tr> <tr> <td>Total Panel SF Previous</td> <td>57,059</td> <td>SF</td> </tr> <tr> <td>Total Panel SF To Date</td> <td>83,924</td> <td>SF</td> </tr> <tr> <td>Total Pay Area To Date Including Anchor Trench</td> <td>86,644</td> <td></td> </tr> <tr> <td>Initial Quantity Previous</td> <td>61,467</td> <td>SF</td> </tr> <tr> <td>Initial Quantity This Page</td> <td>28,428</td> <td>SF</td> </tr> <tr> <td>Initial Quantity To Date</td> <td>89,895</td> <td>SF</td> </tr> </tbody> </table>		Material in Anchor Trench			Total LF In Trench This Page	225.00	LF	Depth and Width Allowed in Trench	3	LF	Total SF Trench This Page	675	SF	Total Panel SF This Page	26,865	SF	Total Pay Area This Page	27,540	SF	LF In Trench Previous	682	LF	LF In Trench To Date	907	LF	SF In Trench Previous	2,045	SF	Total SF in Trench to Date	2,720	SF	Total Panel SF Previous	57,059	SF	Total Panel SF To Date	83,924	SF	Total Pay Area To Date Including Anchor Trench	86,644		Initial Quantity Previous	61,467	SF	Initial Quantity This Page	28,428	SF	Initial Quantity To Date	89,895	SF
Material in Anchor Trench																																																					
Total LF In Trench This Page	225.00	LF																																																			
Depth and Width Allowed in Trench	3	LF																																																			
Total SF Trench This Page	675	SF																																																			
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LF In Trench Previous	682	LF																																																			
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Initial Quantity Previous	61,467	SF																																																			
Initial Quantity This Page	28,428	SF																																																			
Initial Quantity To Date	89,895	SF																																																			
Final Length Avg: 194.00 LF Final Width Avg: 22.50 LF Initial Length Avg: 198.00 LF Initial Width Avg: 23.00 LF		Final Length Avg: 46.00 LF Final Width Avg: 22.50 LF Initial Length Avg: 49.00 LF Initial Width Avg: 23.00 LF																																																			
Notes:		Notes:																																																			
Initial SF: 4,554		Initial SF: 1,127																																																			
Final SF: 4,365		Final SF: 1,035																																																			
Lineal Feet Trench: 22.5		Lineal Feet Trench: 22.5																																																			

Project Name: Nursery Products Job # 103004 Deployment Date \_\_\_\_\_

Superintendent: Vicente Figueroa Material Type: 60 Mil HDPE Liner

Primary  Secondary  Cell  Pond  B Pad  Other: \_\_\_\_\_

Description (i.e. Phase #, Cell #, Pond # etc.)

Roll Stock Width

Panel #	Roll #	Panel #	Roll #	Panel #	Roll #
32	8466	33	6317	34	6317
Final Length Avg. 240.00 LF	Final Length Avg. 243.00 LF	Final Length Avg. 199.00 LF			
Final Width Avg. 3.00 LF	Final Width Avg. 22.50 LF	Final Width Avg. 22.50 LF	Final Width Avg. 22.50 LF	Final Width Avg. 22.50 LF	Final Width Avg. 22.50 LF
Initial Length Avg. 249.00 LF	Initial Length Avg. 252.00 LF	Initial Length Avg. 204.00 LF			
Initial Width Avg. 4.00 LF	Initial Width Avg. 23.00 LF	Initial Width Avg. 23.00 LF	Initial Width Avg. 23.00 LF	Initial Width Avg. 23.00 LF	Initial Width Avg. 23.00 LF
4	23	23	23	23	23
3	22.5	22.5	22.5	22.5	22.5
249 240 240 249	252 243 243 252	204 199 199 204	204 199 199 204	204 199 199 204	204 199 199 204
Notes:	Notes:	Notes:	Notes:	Notes:	Notes:
Initial SF 996	Initial SF 5,796	Initial SF 4,692	Initial SF 4,692	Initial SF 4,692	Initial SF 4,692
Final SF 720	Final SF 5,468	Final SF 4,478	Final SF 4,478	Final SF 4,478	Final SF 4,478
Lineal Feet Trench 6	Lineal Feet Trench 45				
35	6315	36	6315		
Final Length Avg. 45.00 LF	Final Length Avg. 248.00 LF	Final Length Avg. 248.00 LF	Final Length Avg. 248.00 LF	Final Length Avg. 248.00 LF	Final Length Avg. 248.00 LF
Final Width Avg. 22.50 LF	Final Width Avg. 22.50 LF	Final Width Avg. 22.50 LF	Final Width Avg. 22.50 LF	Final Width Avg. 22.50 LF	Final Width Avg. 22.50 LF
Initial Length Avg. 50.00 LF	Initial Length Avg. 255.00 LF	Initial Length Avg. 255.00 LF	Initial Length Avg. 255.00 LF	Initial Length Avg. 255.00 LF	Initial Length Avg. 255.00 LF
Initial Width Avg. 23.00 LF	Initial Width Avg. 23.00 LF	Initial Width Avg. 23.00 LF	Initial Width Avg. 23.00 LF	Initial Width Avg. 23.00 LF	Initial Width Avg. 23.00 LF
23	23	23	23	23	23
22.5	22.5	22.5	22.5	22.5	22.5
50 45 45 50	255 248 248 255	255 248 248 255	255 248 248 255	255 248 248 255	255 248 248 255
Notes:	Notes:	Notes:	Notes:	Notes:	Notes:
Initial SF 1,150	Initial SF 5,865				
Final SF 1,013	Final SF 5,580				
Lineal Feet Trench 22.5	Lineal Feet Trench 45				
36	6315				
Final Length Avg. 45.00 LF	Final Length Avg. 248.00 LF	Final Length Avg. 248.00 LF	Final Length Avg. 248.00 LF	Final Length Avg. 248.00 LF	Final Length Avg. 248.00 LF
Final Width Avg. 22.50 LF	Final Width Avg. 22.50 LF	Final Width Avg. 22.50 LF	Final Width Avg. 22.50 LF	Final Width Avg. 22.50 LF	Final Width Avg. 22.50 LF
Initial Length Avg. 50.00 LF	Initial Length Avg. 255.00 LF	Initial Length Avg. 255.00 LF	Initial Length Avg. 255.00 LF	Initial Length Avg. 255.00 LF	Initial Length Avg. 255.00 LF
Initial Width Avg. 23.00 LF	Initial Width Avg. 23.00 LF	Initial Width Avg. 23.00 LF	Initial Width Avg. 23.00 LF	Initial Width Avg. 23.00 LF	Initial Width Avg. 23.00 LF
23	23	23	23	23	23
22.5	22.5	22.5	22.5	22.5	22.5
50 45 45 50	255 248 248 255	255 248 248 255	255 248 248 255	255 248 248 255	255 248 248 255
Notes:	Notes:	Notes:	Notes:	Notes:	Notes:
Initial SF 1,150	Initial SF 5,865				
Final SF 1,013	Final SF 5,580				
Lineal Feet Trench 22.5	Lineal Feet Trench 45				
<b>Material in Anchor Trench</b>					
Total LF In Trench This Page		163.50		LF	
Depth and Width Allowed in Trench		3		LF	
Total SF Trench This Page		491		SF	
Total Panel SF This Page		17,258		SF	
Total Pay Area This Page		17,748		SF	
LF In Trench Previous		907		LF	
LF In Trench To Date		1,070		LF	
SF In Trench Previous		2,720		SF	
Total SF in Trench to Date		3,210		SF	
Total Panel SF Previous		83,924		SF	
Total Panel SF To Date		101,182		SF	
Total Pay Area To Date Including Anchor Trench		104,392		SF	
Initial Quantity Previous		89,895		SF	
Initial Quantity This Page		18,499		SF	
Initial Quantity To Date		108,394		SF	

Project Name: Nursery Products Job # 103004 Deployment Date \_\_\_\_\_

Superintendent: Vicente Figueroa Material Type: 60 Mil HDPE Liner

Primary     Secondary     Cell     Pond  **B**     Pad    Other: \_\_\_\_\_

Description (i.e. Phase #, Cell #, Pond # etc.)

Roll Stock Width

Panel #	Roll #	Panel #	Roll #	Panel #	Roll #																																																
37	6315	38	8576	39	6315																																																
<p>Final Length Avg: 89.00 LF Final Width Avg: 22.50 LF Initial Length Avg: 92.00 LF Initial Width Avg: 23.00 LF</p>		<p>Final Length Avg: 26.00 LF Final Width Avg: 22.50 LF Initial Length Avg: 29.00 LF Initial Width Avg: 23.00 LF</p>		<p>Final Length Avg: 137.00 LF Final Width Avg: 22.50 LF Initial Length Avg: 140.00 LF Initial Width Avg: 23.00 LF</p>																																																	
Initial SF: 2,116		Initial SF: 667		Initial SF: 3,220																																																	
Final SF: 2,003		Final SF: 585		Final SF: 3,083																																																	
Lineal Feet Trench: 22.5		Lineal Feet Trench: 22.5		Lineal Feet Trench: 22.5																																																	
40	8576	41	8576	42	8576																																																
<p>Final Length Avg: 250.00 LF Final Width Avg: 22.50 LF Initial Length Avg: 256.00 LF Initial Width Avg: 23.00 LF</p>		<p>Final Length Avg: 126.00 LF Final Width Avg: 11.00 LF Initial Length Avg: 130.00 LF Initial Width Avg: 11.00 LF</p>		<p>Final Length Avg: 113.00 LF Final Width Avg: 11.00 LF Initial Length Avg: 117.00 LF Initial Width Avg: 13.00 LF</p>																																																	
Initial SF: 5,888		Initial SF: 1,430		Initial SF: 1,521																																																	
Final SF: 5,625		Final SF: 1,386		Final SF: 1,243																																																	
Lineal Feet Trench: 45		Lineal Feet Trench: 22.5		Lineal Feet Trench: 13																																																	
43	8576	44	8576	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3">Material in Anchor Trench</th> </tr> </thead> <tbody> <tr> <td>Total LF In Trench This Page</td> <td>170.50</td> <td>LF</td> </tr> <tr> <td>Depth and Width Allowed in Trench</td> <td>3</td> <td>LF</td> </tr> <tr> <td>Total SF Trench This Page</td> <td>512</td> <td>SF</td> </tr> <tr> <td>Total Panel SF This Page</td> <td>15,972</td> <td>SF</td> </tr> <tr> <td>Total Pay Area This Page</td> <td>16,483</td> <td>SF</td> </tr> <tr> <td>LF In Trench Previous</td> <td>1,070</td> <td>LF</td> </tr> <tr> <td>LF In Trench To Date</td> <td>1,241</td> <td>LF</td> </tr> <tr> <td>SF In Trench Previous</td> <td>3,210</td> <td>SF</td> </tr> <tr> <td>Total SF in Trench to Date</td> <td>3,722</td> <td>SF</td> </tr> <tr> <td>Total Panel SF Previous</td> <td>101,182</td> <td>SF</td> </tr> <tr> <td>Total Panel SF To Date</td> <td>117,153</td> <td>SF</td> </tr> <tr> <td><b>Total Pay Area To Date Including Anchor Trench</b></td> <td><b>120,875</b></td> <td></td> </tr> <tr> <td>Initial Quantity Previous</td> <td>108,394</td> <td>SF</td> </tr> <tr> <td>Initial Quantity This Page</td> <td>17,142</td> <td>SF</td> </tr> <tr> <td>Initial Quantity To Date</td> <td>125,536</td> <td>SF</td> </tr> </tbody> </table>		Material in Anchor Trench			Total LF In Trench This Page	170.50	LF	Depth and Width Allowed in Trench	3	LF	Total SF Trench This Page	512	SF	Total Panel SF This Page	15,972	SF	Total Pay Area This Page	16,483	SF	LF In Trench Previous	1,070	LF	LF In Trench To Date	1,241	LF	SF In Trench Previous	3,210	SF	Total SF in Trench to Date	3,722	SF	Total Panel SF Previous	101,182	SF	Total Panel SF To Date	117,153	SF	<b>Total Pay Area To Date Including Anchor Trench</b>	<b>120,875</b>		Initial Quantity Previous	108,394	SF	Initial Quantity This Page	17,142	SF	Initial Quantity To Date	125,536	SF
Material in Anchor Trench																																																					
Total LF In Trench This Page	170.50	LF																																																			
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LF In Trench Previous	1,070	LF																																																			
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Initial Quantity Previous	108,394	SF																																																			
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Initial Quantity To Date	125,536	SF																																																			
<p>Final Length Avg: 45.00 LF Final Width Avg: 22.50 LF Initial Length Avg: 48.00 LF Initial Width Avg: 23.00 LF</p>		<p>Final Length Avg: 46.00 LF Final Width Avg: 22.50 LF Initial Length Avg: 52.00 LF Initial Width Avg: 23.00 LF</p>																																																			
Initial SF: 1,104		Initial SF: 1,196																																																			
Final SF: 1,013		Final SF: 1,035																																																			
Lineal Feet Trench: 22.5		Lineal Feet Trench: 22.5																																																			

Project Name: Nursery Products Job # 103004 Deployment Date \_\_\_\_\_

Superintendent: Vicente Figueroa Material Type: 60 Mil HDPE Liner

Primary    Secondary     Cell     Pond  **B**    Pad     Other: \_\_\_\_\_

Description (i.e. Phase #, Cell #, Pond # etc.)

Roll Stock Width

Panel #	Roll #	Description		Panel #	Roll #	Description		Panel #	Roll #	Description																																																	
45	6318	Final Length Avg.	43.00 LF	46	6318	Final Length Avg.	42.00 LF	47	6318	Final Length Avg.	42.00 LF																																																
		Final Width Avg.	22.50 LF			Final Width Avg.	22.50 LF			Final Width Avg.	22.50 LF																																																
		Initial Length Avg.	46.00 LF			Initial Length Avg.	45.00 LF			Initial Length Avg.	45.00 LF																																																
		Initial Width Avg.	23.00 LF			Initial Width Avg.	23.00 LF			Initial Width Avg.	23.00 LF																																																
		23				23				23																																																	
		22.5				22.5				22.5																																																	
		46	43	43	46	45	42	42	45	45	42	42	45																																														
Notes:				Notes:				Notes:																																																			
Initial SF	1,058	Lineal Feet Trench		Initial SF	1,035	Lineal Feet Trench		Initial SF	1,035	Lineal Feet Trench																																																	
Final SF	968	22.5		Final SF	945	22.5		Final SF	945	22.5																																																	
48	6318	Final Length Avg.	42.00 LF	49	6318	Final Length Avg.	43.00 LF	50	6318	Final Length Avg.	43.00 LF																																																
		Final Width Avg.	22.50 LF			Final Width Avg.	22.50 LF			Final Width Avg.	22.50 LF																																																
		Initial Length Avg.	44.00 LF			Initial Length Avg.	46.00 LF			Initial Length Avg.	47.00 LF																																																
		Initial Width Avg.	23.00 LF			Initial Width Avg.	23.00 LF			Initial Width Avg.	23.00 LF																																																
		23				23				23																																																	
		22.5				22.5				22.5																																																	
		44	42	42	44	46	43	43	46	47	43	43	47																																														
Notes:				Notes:				Notes:																																																			
Initial SF	1,012	Lineal Feet Trench		Initial SF	1,058	Lineal Feet Trench		Initial SF	1,081	Lineal Feet Trench																																																	
Final SF	945	22.5		Final SF	968	22.5		Final SF	968	22.5																																																	
51	6318	Final Length Avg.	43.00 LF	52	6318	Final Length Avg.	42.00 LF	<table border="1"> <thead> <tr> <th colspan="3">Material in Anchor Trench</th> </tr> </thead> <tbody> <tr> <td>Total LF In Trench This Page</td> <td>180.00</td> <td>LF</td> </tr> <tr> <td>Depth and Width Allowed in Trench</td> <td>3</td> <td>LF</td> </tr> <tr> <td>Total SF Trench This Page</td> <td>540</td> <td>SF</td> </tr> <tr> <td>Total Panel SF This Page</td> <td>7,650</td> <td>SF</td> </tr> <tr> <td>Total Pay Area This Page</td> <td>8,190</td> <td>SF</td> </tr> <tr> <td>LF In Trench Previous</td> <td>1,241</td> <td>LF</td> </tr> <tr> <td>LF In Trench To Date</td> <td>1,421</td> <td>LF</td> </tr> <tr> <td>SF In Trench Previous</td> <td>3,722</td> <td>SF</td> </tr> <tr> <td>Total SF in Trench to Date</td> <td>4,262</td> <td>SF</td> </tr> <tr> <td>Total Panel SF Previous</td> <td>117,153</td> <td>SF</td> </tr> <tr> <td>Total Panel SF To Date</td> <td>124,803</td> <td>SF</td> </tr> <tr> <td>Total Pay Area To Date Including Anchor Trench</td> <td>129,065</td> <td></td> </tr> <tr> <td>Initial Quantity Previous</td> <td>125,536</td> <td>SF</td> </tr> <tr> <td>Initial Quantity This Page</td> <td>8,372</td> <td>SF</td> </tr> <tr> <td>Initial Quantity To Date</td> <td>133,908</td> <td>SF</td> </tr> </tbody> </table>				Material in Anchor Trench			Total LF In Trench This Page	180.00	LF	Depth and Width Allowed in Trench	3	LF	Total SF Trench This Page	540	SF	Total Panel SF This Page	7,650	SF	Total Pay Area This Page	8,190	SF	LF In Trench Previous	1,241	LF	LF In Trench To Date	1,421	LF	SF In Trench Previous	3,722	SF	Total SF in Trench to Date	4,262	SF	Total Panel SF Previous	117,153	SF	Total Panel SF To Date	124,803	SF	Total Pay Area To Date Including Anchor Trench	129,065		Initial Quantity Previous	125,536	SF	Initial Quantity This Page	8,372	SF	Initial Quantity To Date	133,908	SF
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**ECApplications, Inc.**  
Daily Panel Placement

Project Name: Nursery Products Job # 103004 Deployment Date \_\_\_\_\_

Superintendent: Vicente Figueroa Material Type: 60 Mil HDPE Liner

Primary    Secondary     Cell     Pond  **B**    Pad     Other: \_\_\_\_\_

Description (i.e. Phase #, Cell #, Pond # etc.)

Roll Stock Width \_\_\_\_\_

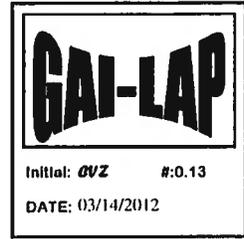
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# Appendix D

## Geosynthetic Independent Laboratory Test Results



Shannon Goodrich  
**Zero Energy Institute**  
 3550 Windsor Road  
 Oceanside, CA, 92056



Dear Mr. Goodrich:

Thank you for consulting Precision Geosynthetic Laboratories International (PGLI) for your material testing needs.

Enclosed is the *final* laboratory report for the seam testing of twelve (12) 60mil HDPE Seam samples.

**PROJECT NAME:** Hawes Composting Facility **POND A**

**REFERENCE PGL JOB NO.:** G120211

**DATE RECEIVED:** March 13, 2012

**DATE REPORTED:** March 14, 2012

**SAMPLES DELIVERED BY:** Zero Energy Institute, CA

**SAMPLE IDENTIFICATIONS:**

SAMPLE ID	PGLI CONTROL NUMBER
DS-1 P4/P2	80137
DS-2 P6/P5	80138
DS-3 P10/P8	80139
DS-4 P1/P11	80140
DS-5 P15/P14	80141
DS-6 P1/P18	80142
DS-7 P21/P2	80143
DS-8 P25/P24	80144
DS-9 P28/P27	80145
DS-10 P28/P30	80146
DS-11 P38/P39	80147
DS-12 P42/P40	80148

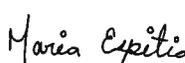
**TESTS REQUIRED/PERFORMED:**

TEST METHOD	DESCRIPTION
ASTM D6392	Shear Bond Strength
ASTM DD6392	Peel Bond Adhesion

**TEST CONDITIONS:** The samples were conditioned for a minimum of one hour in the laboratory at 22 ± 2°C (71.6 ± 3.6°F) and at 60 ± 10% relative humidity prior to test.

**TEST RESULTS:** The test results are summarized in Tables 1 to 6.

**PRECISION GEOSYNTHETIC LABORATORIES INTERNATIONAL**

 Maria Espitia Quality Assurance	 Carmelo V. Zantua Technical/Laboratory Director
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It shall be noted that the samples tested are believed to be true representatives of the material produced under the designation herein stated. In addition, the attached laboratory tests results are considered indicative only of the quality of samples/specimens that were actually tested. The appropriate test methods hereby employed are based on the current and accepted industry practices. Precision Geosynthetic Laboratories neither accepts responsibility for nor makes claims to the intended final use and purpose of the material. The test data and all associated project information shall be held confidential and not to be reproduced and/or disclosed to other parties except in full and with prior written approval from pertinent entity duly authorized by the respective client or from the client itself. It is a policy of the company to keep physical records of each job for two (2) years commencing from the date of receipt of the samples and keep its corresponding electronic file for seven (7) years. *Failed seam samples are kept for two (2) years and good seam samples are disposed of after two (2) weeks.*

**TABLE 1.  
SEAM PEEL AND SHEAR TEST RESULTS**

CLIENT: **Zero Energy Institute**  
PROJECT: **Hawes Composting Facility**  
DATE REC'D: **13-Mar-12**

MATERIAL: **60mil HDPE SEAM**  
SEAM TYPE: **Fusion Weld**  
PGLI JOB #: **G120211**

QC'd By: *Maria Capitan*  
TEST METHOD: **ASTM D6392**  
DATE REPORT: **14-Mar-12**

Crosshead Speed: 2 in/min						Crosshead Speed: 2 in/min					
SAMPLE ID	PGLI CONTROL #	SHEAR EVALUATION				PROJECT SPEC. (lb/in width)	SPECIMEN NUMBER	PEEL EVALUATION			
		MAXIMUM STRENGTH (lb/in width)	% Elongation	Locus of Break	PROJECT SPEC. (lb/in width)			MAXIMUM STRENGTH (lb/in width)	% INCURSION (%)	LOCUS OF BREAK	PROJECT SPEC. (lb/in width)
DS-1 P4/P2	80137	171	> 50%	BRK	120	1 Outside	136	0	SE1	91	
		172	> 50%	BRK		2 Outside	127	0	SE1		
		176	> 50%	BRK		3 Outside	126	0	SE1		
		175	> 50%	BRK		4 Outside	131	0	SE1		
		176	> 50%	BRK		5 Outside	138	0	SE1		
		AVG:	174				120	AVG:	132		
STD. DEV.	2				STD. DEV.	5					
DS-2 P6/P5	80138	180	> 50%	BRK	120	1 Inside	137	0	SE1	91	
		181	> 50%	BRK		2 Inside	136	0	SE1		
		176	> 50%	BRK		3 Inside	140	0	SE1		
		179	> 50%	BRK		4 Inside	150	0	SE1		
		178	> 50%	BRK		5 Inside	141	0	SE1		
		AVG:	179				120	AVG:	141		
STD. DEV.	2				STD. DEV.	6					

<b>BREAK DESCRIPTION (ASTM D6392 FUSION):</b>	<b>EXTRUSION:</b>	AD1	ADHESION FAILURE. SPECIMENS DELAMINATED UNDER THE BEAD.
AD		AD2	ADHESION FAILURE.
BRK		AD-WLD	BREAK THROUGH THE FILLET.
SE1		SE1	BREAK AT BOTTOM EDGE OF SEAM.
SE2		SE2	BREAK AT TOP EDGE OF SEAM.
AD-BRK		SE3	BREAK AT BOTTOM EDGE OF SEAM (for PEEL only)
SIP		BRK1	BREAK IN BOTTOM SHEETING.
		BRK2	BREAK IN TOP SHEETING.
		AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
		HT	BREAK AT EDGE OF HOT TACK
		SIP	SEPARATION IN THE PLANE OF THE SHEET.

By accepting the data and results presented on this report, the Client agrees to limit the liability of Precision Geosynthetic Laboratories from Client and all other parties for claims on issues, due to the use of this data, to the cost for the respective tests presented in this report; and the Client agrees to indemnify and hold harmless Precision Geosynthetic Laboratories from and against all liabilities in excess of the aforementioned limit.

**TABLE 2.  
SEAM PEEL AND SHEAR TEST RESULTS**

CLIENT: **Zero Energy Institute**  
PROJECT: **Hawes Composting Facility**  
DATE REC'D: **13-Mar-12**

MATERIAL: **60mil HDPE SEAM**  
SEAM TYPE: **Fusion Weld**  
PGLI JOB #: **G120211**

QC'd By: *Marin Epitio*  
TEST METHOD: **ASTM D6392**  
DATE REPORT: **14-Mar-12**

Crosshead Speed: 2 in/min						Crosshead Speed: 2 in/min								
SAMPLE ID	PGLI CONTROL #	SHEAR EVALUATION				PEEL EVALUATION								
		MAXIMUM STRENGTH (lb/in width)	% Elongation	Locus of Break	PROJECT SPEC. (lb/in width)	SPECIMEN NUMBER	MAXIMUM STRENGTH (lb/in width)	% INCURSION (%)	LOCUS OF BREAK	PROJECT SPEC. (lb/in width)				
DS- 3 P10/P8	80139	171	> 50%	BRK	120	1 Outside	138	0	SE1	91				
		172	> 50%	BRK		2 Outside	140	0	SE1					
		176	> 50%	BRK		3 Outside	141	0	SE1					
		175	> 50%	BRK		4 Outside	138	0	SE1					
		174	> 50%	BRK		5 Outside	141	0	SE1					
		AVG.		174					AVG:		140			
		STD. DEV.		2					STD. DEV.		2			
		1	Inside	129		0	SE1							
		2	Inside	135		0	SE1							
		3	Inside	142		0	SE1							
4	Inside	140	0	SE1										
5	Inside	130	0	SE1										
AVG:		173				AVG:	135							
STD. DEV.		1				STD. DEV.	6							
DS- 4 P1/P11	80140	172	> 50%	BRK	120	1 Outside	138	0	SE1	91				
		174	> 50%	BRK		2 Outside	140	0	SE1					
		173	> 50%	BRK		3 Outside	127	0	SE1					
		174	> 50%	BRK		4 Outside	125	0	SE1					
		171	> 50%	BRK		5 Outside	135	0	SE1					
		AVG:		173					AVG:		133			
		STD. DEV.		1					STD. DEV.		7			
		1	Inside	136		0	SE1							
		2	Inside	142		0	SE1							
		3	Inside	140		0	SE1							
4	Inside	127	0	SE1										
5	Inside	138	0	SE1										
AVG:		173				AVG:	137							
STD. DEV.		1				STD. DEV.	6							

**BREAK DESCRIPTION (ASTM D6392 FUSION):**

AD ADHESION FAILURE.  
BRK BREAK IN SHEETING.  
SE1 BREAK AT OUTER EDGE OF SEAM.  
SE2 BREAK AT INNER EDGE OF SEAM.  
AD-BRK BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.  
SIP SEPARATION IN THE PLANE OF THE SHEET.

**EXTRUSION:**

AD1  
AD2  
AD-WLD  
SE1  
SE2  
SE3  
BRK1  
BRK2  
AD-BRK  
HT  
SIP

ADHESION FAILURE. SPECIMENS DELAMINATED UNDER THE BEAD.  
ADHESION FAILURE.  
BREAK THROUGH THE FILLET.  
BREAK AT BOTTOM EDGE OF SEAM.  
BREAK AT TOP EDGE OF SEAM.  
BREAK AT BOTTOM EDGE OF SEAM (for PEEL only)  
BREAK IN BOTTOM SHEETING.  
BREAK IN TOP SHEETING.  
BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.  
BREAK AT EDGE OF HOT TACK  
SEPARATION IN THE PLANE OF THE SHEET.

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**TABLE 3.  
SEAM PEEL AND SHEAR TEST RESULTS**

CLIENT: **Zero Energy Institute**  
PROJECT: **Hawes Composting Facility**  
DATE REC'D: **13-Mar-12**

MATERIAL: **60mil HDPE SEAM**  
SEAM TYPE: **Fusion Weld**  
PGLI JOB #: **G120211**

QC'd By: *Maria Capita*  
TEST METHOD: **ASTM D6392**  
DATE REPORT: **14-Mar-12**

Crosshead Speed: 2 in/min						Crosshead Speed: 2 in/min							
SAMPLE ID	PGLI CONTROL #	SHEAR EVALUATION				PEEL EVALUATION							
		MAXIMUM STRENGTH (lb/in width)	% Elongation	Locus of Break	PROJECT SPEC. (lb/in width)	SPECIMEN NUMBER	MAXIMUM STRENGTH (lb/in width)	% INCURSION (%)	LOCUS OF BREAK	PROJECT SPEC. (lb/in width)			
DS- 5 P15/P14	80141	176	> 50%	BRK	120	1 Outside	137	0	SE1	91			
		180	> 50%	BRK		2 Outside	140	0	SE1				
		176	> 50%	BRK		3 Outside	142	0	SE1				
		179	> 50%	BRK		4 Outside	137	0	SE1				
		178	> 50%	BRK		5 Outside	135	0	SE1				
		AVG:		178				AVG:	138				
		STD. DEV.		2				STD. DEV.	3				
		178	> 50%	BRK		120	1 Inside	138	0		SE1	91	
		174	> 50%	BRK			2 Inside	130	0		SE1		
		176	> 50%	BRK			3 Inside	131	0		SE1		
176	> 50%	BRK	4 Inside	130	0		SE1						
180	> 50%	BRK	5 Inside	141	0		SE1						
AVG:		177			AVG:		134						
STD. DEV.		2			STD. DEV.		5						
DS- 6 P1/P18	80142	178	> 50%	BRK	120		1 Outside	140	0	SE1	91		
		174	> 50%	BRK			2 Outside	143	0	SE1			
		176	> 50%	BRK			3 Outside	138	0	SE1			
		176	> 50%	BRK		4 Outside	135	0	SE1				
		180	> 50%	BRK		5 Outside	140	0	SE1				
		AVG:		177				AVG:	139				
		STD. DEV.		2				STD. DEV.	3				
		142	> 50%	BRK		120	1 Inside	142	0	SE1		91	
		140	> 50%	BRK			2 Inside	140	0	SE1			
		138	> 50%	BRK			3 Inside	138	0	SE1			
135	> 50%	BRK	4 Inside	135	0		SE1						
136	> 50%	BRK	5 Inside	136	0		SE1						
AVG:		138			AVG:		138						
STD. DEV.		2			STD. DEV.		3						

<b>BREAK DESCRIPTION (ASTM D6392 FUSION):</b>	<b>EXTRUSION:</b>	AD1	ADHESION FAILURE. SPECIMENS DELAMINATED UNDER THE BEAD.
AD		AD2	ADHESION FAILURE.
BRK		AD-WLD	BREAK THROUGH THE FILLET.
SE1		SE1	BREAK AT BOTTOM EDGE OF SEAM.
SE2		SE2	BREAK AT TOP EDGE OF SEAM.
AD-BRK		SE3	BREAK AT BOTTOM EDGE OF SEAM (for PEEL only)
SIP		BRK1	BREAK IN BOTTOM SHEETING.
		BRK2	BREAK IN TOP SHEETING.
		AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
		HT	BREAK AT EDGE OF HOT TACK
		SIP	SEPARATION IN THE PLANE OF THE SHEET.

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**TABLE 4.  
SEAM PEEL AND SHEAR TEST RESULTS**

CLIENT: **Zero Energy Institute**  
PROJECT: **Hawes Composting Facility**  
DATE REC'D: **13-Mar-12**

MATERIAL: **60mil HDPE SEAM**  
SEAM TYPE: **Fusion Weld**  
PGLI JOB #: **G120211**

QC'd By: *Maria Epstein*  
TEST METHOD: **ASTM D6392**  
DATE REPORT: **14-Mar-12**

Crosshead Speed: 2 in/min						Crosshead Speed: 2 in/min					
SAMPLE ID	PGLI CONTROL #	SHEAR EVALUATION				PROJECT SPEC. (lb/in width)	SPECIMEN NUMBER	PEEL EVALUATION			
		MAXIMUM STRENGTH (lb/in width)	% Elongation	Locus of Break	PROJECT SPEC. (lb/in width)			MAXIMUM STRENGTH (lb/in width)	% INCURSION (%)	LOCUS OF BREAK	PROJECT SPEC. (lb/in width)
DS-7 P21/P2	80143	171	> 50%	BRK	120	1 Outside	135	0	SE1	91	
		174	> 50%	BRK		2 Outside	140	0	SE1		
		172	> 50%	BRK		3 Outside	141	0	SE1		
		172	> 50%	BRK		4 Outside	138	0	SE1		
		170	> 50%	BRK		5 Outside	127	0	SE1		
		AVG:	172				128				
STD. DEV.	1			6							
DS-8 P25/P24	80144	168	> 50%	BRK	120	1 Outside	142	0	SE1	91	
		169	> 50%	BRK		2 Outside	140	0	SE1		
		170	> 50%	BRK		3 Outside	127	0	SE1		
		170	> 50%	BRK		4 Outside	127	0	SE1		
		167	> 50%	BRK		5 Outside	130	0	SE1		
		AVG:	169				128				
STD. DEV.	1			2							

<b>BREAK DESCRIPTION (ASTM D6392 FUSION):</b>	<b>EXTRUSION:</b>	AD1	ADHESION FAILURE, SPECIMENS DELAMINATED UNDER THE BEAD.
AD		AD2	ADHESION FAILURE.
BRK		AD-WLD	BREAK THROUGH THE FILLET.
SE1		SE1	BREAK AT BOTTOM EDGE OF SEAM.
SE2		SE2	BREAK AT TOP EDGE OF SEAM.
AD-BRK		SE3	BREAK AT BOTTOM EDGE OF SEAM (for PEEL only)
SIP		BRK1	BREAK IN BOTTOM SHEETING.
		BRK2	BREAK IN TOP SHEETING.
		AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
		HT	BREAK AT EDGE OF HOT TACK
		SIP	SEPARATION IN THE PLANE OF THE SHEET.

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**TABLE 5.  
SEAM PEEL AND SHEAR TEST RESULTS**

CLIENT: **Zero Energy Institute**  
PROJECT: **Hawes Composting Facility**  
DATE REC'D: **13-Mar-12**

MATERIAL: **60mil HDPE SEAM**  
SEAM TYPE: **Fusion Weld**  
PGLI JOB #: **G120211**

QC'd By: *Maria Epstein*  
TEST METHOD: **ASTM D6392**  
DATE REPORT: **14-Mar-12**

Crosshead Speed: 2 in/min						Crosshead Speed: 2 in/min					
SAMPLE ID	PGLI CONTROL #	SHEAR EVALUATION				PROJECT SPEC. (lb/in width)	PEEL EVALUATION				
		MAXIMUM STRENGTH (lb/in width)	% Elongation	Locus of Break	PROJECT SPEC. (lb/in width)		SPECIMEN NUMBER	MAXIMUM STRENGTH (lb/in width)	% INCURSION (%)	LOCUS OF BREAK	PROJECT SPEC. (lb/in width)
DS- 9 P28/P27	80145	175	> 50%	BRK	120	1 Outside	139	0	SE1	91	
		176	> 50%	BRK		2 Outside	141	0	SE1		
		175	> 50%	BRK		3 Outside	140	0	SE1		
		174	> 50%	BRK		4 Outside	140	0	SE1		
		174	> 50%	BRK		5 Outside	138	0	SE1		
		AVG:	175				AVG:	140			
STD. DEV.	1			STD. DEV.	1						
DS- 10 P28/P30	80146	172	> 50%	BRK	120	1 Outside	140	0	SE1	91	
		176	> 50%	BRK		2 Outside	138	0	SE1		
		174	> 50%	BRK		3 Outside	142	0	SE1		
		173	> 50%	BRK		4 Outside	138	0	SE1		
		173	> 50%	BRK		5 Outside	137	0	SE1		
		AVG:	174				AVG:	139			
STD. DEV.	2			STD. DEV.	2						
					1 Inside	136	0	SE1			
					2 Inside	127	0	SE1			
					3 Inside	127	0	SE1			
					4 Inside	130	0	SE1			
					5 Inside	128	0	SE1			
					AVG:	130					
					STD. DEV.	4					

<b>BREAK DESCRIPTION (ASTM D6392 FUSION):</b>	<b>EXTRUSION:</b>	AD1	ADHESION FAILURE. SPECIMENS DELAMINATED UNDER THE BEAD.
AD		AD2	ADHESION FAILURE.
BRK		AD-WLD	BREAK THROUGH THE FILLET.
SE1		SE1	BREAK AT BOTTOM EDGE OF SEAM.
SE2		SE2	BREAK AT TOP EDGE OF SEAM.
AD-BRK		SE3	BREAK AT BOTTOM EDGE OF SEAM (for PEEL only)
SIP		BRK1	BREAK IN BOTTOM SHEETING.
		BRK2	BREAK IN TOP SHEETING.
		AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
		HT	BREAK AT EDGE OF HOT TACK
		SIP	SEPARATION IN THE PLANE OF THE SHEET.

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**TABLE 6.  
SEAM PEEL AND SHEAR TEST RESULTS**

CLIENT: **Zero Energy Institute**  
 PROJECT: **Hawes Composting Facility**  
 DATE REC'D: **13-Mar-12**

MATERIAL: **60mil HDPE SEAM**  
 SEAM TYPE: **Fusion Weld**  
 PGLI JOB #: **G120211**

QC'd By: *Maria Capitan*  
 TEST METHOD: **ASTM D6392**  
 DATE REPORT: **14-Mar-12**

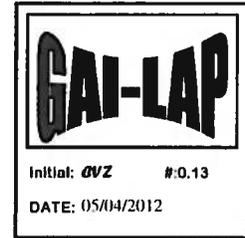
Crosshead Speed: 2 in/min						Crosshead Speed: 2 in/min							
SAMPLE ID	PGLI CONTROL #	SHEAR EVALUATION				PEEL EVALUATION							
		MAXIMUM STRENGTH (lb/in width)	% Elongation	Locus of Break	PROJECT SPEC. (lb/in width)	SPECIMEN NUMBER	MAXIMUM STRENGTH (lb/in width)	% INCURSION (%)	LOCUS OF BREAK	PROJECT SPEC. (lb/in width)			
DS- 11 P38/P39	80147	180	> 50%	BRK		1 Outside	135	0	SE1				
		181	> 50%	BRK		2 Outside	140	0	SE1				
		180	> 50%	BRK		3 Outside	143	0	SE1				
		179	> 50%	BRK		4 Outside	137	0	SE1				
		179	> 50%	BRK		5 Outside	135	0	SE1				
		AVG:		138					91				
		STD. DEV.		3									
				142		0	SE1						
				127		0	SE1						
				127		0	SE1						
		130	0	SE1									
		130	0	SE1									
AVG:		131	120			91							
STD. DEV.		1				6							
DS- 12 P42/P40	80148	176	> 50%	BRK		1 Outside	131	0	SE1				
		175	> 50%	BRK		2 Outside	127	0	SE1				
		178	> 50%	BRK		3 Outside	128	0	SE1				
		178	> 50%	BRK		4 Outside	129	0	SE1				
		174	> 50%	BRK		5 Outside	129	0	SE1				
		AVG:		129					91				
		STD. DEV.		2									
				131		0	SE1						
				130		0	SE1						
				131		0	SE1						
		129	0	SE1									
		125	0	SE1									
AVG:		129	120			91							
STD. DEV.		2				2							

<b>BREAK DESCRIPTION (ASTM D6392 FUSION):</b>	<b>EXTRUSION:</b>	AD1	ADHESION FAILURE. SPECIMENS DELAMINATED UNDER THE BEAD.
AD		AD2	ADHESION FAILURE.
BRK		AD-WLD	BREAK THROUGH THE FILLET.
SE1		SE1	BREAK AT BOTTOM EDGE OF SEAM.
SE2		SE2	BREAK AT TOP EDGE OF SEAM.
AD-BRK		SE3	BREAK AT BOTTOM EDGE OF SEAM (for PEEL only)
SIP		BRK1	BREAK IN BOTTOM SHEETING.
		BRK2	BREAK IN TOP SHEETING.
		AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
		HT	BREAK AT EDGE OF HOT TACK
		SIP	SEPARATION IN THE PLANE OF THE SHEET.

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Shannon Goodrich  
**Zero Energy Institute**  
3550 Windsor Road  
Oceanside, CA, 92056



Dear Mr. Goodrich:

Thank you for consulting Precision Geosynthetic Laboratories International (PGLI) for your material testing needs.

Enclosed is the *final* laboratory report for the seam testing of six (6) 60mil HDPE Seam samples.

**PROJECT NAME:** Hawes Composting Facility **POND B**

**REFERENCE PGL JOB NO.:** G120423

**DATE RECEIVED:** May 4, 2012

**DATE REPORTED:** May 4, 2012

**SAMPLES DELIVERED BY:** Zero Energy Institute, CA

**SAMPLE IDENTIFICATIONS:**

SAMPLE ID	PGLI CONTROL NUMBER
DS-1 P22/P23	81261
DS-2 P26/P27	81262
DS-3 P03/P32	81263
DS-4 P36/P37	81264
DS-5 P16/P41	81265
DS-6 P51/P52	81266

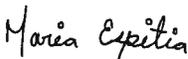
**TESTS REQUIRED/PERFORMED:**

TEST METHOD	DESCRIPTION
ASTM D6392	Shear Bond Strength
ASTM D6392	Peel Bond Adhesion

**TEST CONDITIONS:** The samples were conditioned for a minimum of one hour in the laboratory at  $22 \pm 2^{\circ}\text{C}$  ( $71.6 \pm 3.6^{\circ}\text{F}$ ) and at  $60 \pm 10\%$  relative humidity prior to test.

**TEST RESULTS:** The test results are summarized in Tables 1 to 3.

**PRECISION GEOSYNTHETIC LABORATORIES INTERNATIONAL**



Maria Espitia  
Quality Assurance



Carmelo V. Zantua  
Technical/Laboratory Director

It shall be noted that the samples tested are believed to be true representatives of the material produced under the designation herein stated. In addition, the attached laboratory tests results are considered indicative only of the quality of samples/specimens that were actually tested. The appropriate test methods hereby employed are based on the current and accepted industry practices. Precision Geosynthetic Laboratories neither accepts responsibility for nor makes claims to the intended final use and purpose of the material. The test data and all associated project information shall be held confidential and not to be reproduced and/or disclosed to other parties except in full and with prior written approval from pertinent entity duly authorized by the respective client or from the client itself. It is a policy of the company to keep physical records of each job for two (2) years commencing from the date of receipt of the samples and keep its corresponding electronic file for seven (7) years. *Failed seam samples are kept for two (2) years and good seam samples are disposed of after two (2) weeks.*

**TABLE 1.  
SEAM PEEL AND SHEAR TEST RESULTS**

CLIENT: **Zoro Energy Institute**  
 PROJECT: **Hawes Composting Facility**  
 DATE REC'D: **4-May-12**

MATERIAL: **60mil HDPE SEAM**  
 SEAM TYPE: **Fusion Weld**  
 PGLI JOB #: **G120423**

QC'd By: *Maria Espitia*  
 TEST METHOD: **ASTM D6392**  
 DATE REPORT: **4-May-12**

Crosshead Speed: 2 in/min						Crosshead Speed: 2 in/min							
SAMPLE ID	PGLI CONTROL #	SHEAR EVALUATION				PROJECT SPEC (lb/in width)	PEEL EVALUATION						
		MAXIMUM STRENGTH (lb/in width)	% Elongation	Locus of Break	SPECIMEN NUMBER		MAXIMUM STRENGTH (lb/in width)	% INCURSION (%)	LOCUS OF BREAK	PROJECT SPEC. (lb/in width)			
DS- 1 P22/P23	81261	167	> 50%	BRK	120	1 Outside	130	0	SE1	91			
		166	> 50%	BRK		2 Outside	127	0	SE1				
		167	> 50%	BRK		3 Outside	136	0	SE1				
		169	> 50%	BRK		4 Outside	141	0	SE1				
		165	> 50%	BRK		5 Outside	129	0	SE1				
		AVG:		167				AVG:	133				
		STD. DEV.		1				STD. DEV.	6				
		1 Inside	130	0		SE1							
		2 Inside	136	0		SE1							
		3 Inside	130	0		SE1							
		4 Inside	131	0		SE1							
5 Inside	127	0	SE1										
AVG:		167			AVG:	131							
STD. DEV.		1			STD. DEV.	3							
DS- 2 P26/P27	81262	163	> 50%	BRK	120	1 Outside	136	0	SE1	91			
		160	> 50%	BRK		2 Outside	141	0	SE1				
		162	> 50%	BRK		3 Outside	127	0	SE1				
		161	> 50%	BRK		4 Outside	130	0	SE1				
		160	> 50%	BRK		5 Outside	124	0	SE1				
		AVG:		161				AVG:	132				
		STD. DEV.		1				STD. DEV.	7				
		1 Inside	127	0		SE1							
		2 Inside	130	0		SE1							
		3 Inside	137	0		SE1							
		4 Inside	130	0		SE1							
5 Inside	127	0	SE1										
AVG:		161			AVG:	130							
STD. DEV.		1			STD. DEV.	4							

<b>BREAK DESCRIPTION (ASTM D6392 FUSION):</b>	<b>EXTRUSION:</b>	AD1	ADHESION FAILURE. SPECIMENS DELAMINATED UNDER THE BEAD.
AD	ADHESION FAILURE.	AD2	ADHESION FAILURE.
BRK	BREAK IN SHEETING.	AD-WLD	BREAK THROUGH THE FILLET.
SE1	BREAK AT OUTER EDGE OF SEAM.	SE1	BREAK AT BOTTOM EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM.	SE2	BREAK AT TOP EDGE OF SEAM.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.	SE3	BREAK AT BOTTOM EDGE OF SEAM (for PEEL only)
SIP	SEPARATION IN THE PLANE OF THE SHEET.	BRK1	BREAK IN BOTTOM SHEETING.
		BRK2	BREAK IN TOP SHEETING.
		AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
		HT	BREAK AT EDGE OF HOT TACK
		SIP	SEPARATION IN THE PLANE OF THE SHEET.

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**TABLE 2.  
SEAM PEEL AND SHEAR TEST RESULTS**

CLIENT: **Zero Energy Institute**  
PROJECT: **Hawes Composting Facility**  
DATE REC'D: **4-May-12**

MATERIAL: **60mil HDPE SEAM**  
SEAM TYPE: **Fusion Weld**  
PGLI JOB #: **G120423**

QC'd By: *Maria Epita*  
TEST METHOD: **ASTM D6392**  
DATE REPORT: **4-May-12**

Crosshead Speed: 2 in/min						Crosshead Speed: 2 in/min					
SAMPLE ID	PGLI CONTROL #	SHEAR EVALUATION				PROJECT SPEC. (lb/in width)	SPECIMEN NUMBER	PEEL EVALUATION			
		MAXIMUM STRENGTH (lb/in width)	% Elongation	Locus of Break	PROJECT SPEC. (lb/in width)			MAXIMUM STRENGTH (lb/in width)	% INCURSION (%)	LOCUS OF BREAK	PROJECT SPEC. (lb/in width)
DS- 3 P03/P32	81263	170	> 50%	BRK	120	1 Outside	138	0	SE1	91	
		171	> 50%	BRK		2 Outside	141	0	SE1		
		168	> 50%	BRK		3 Outside	140	0	SE1		
		165	> 50%	BRK		4 Outside	127	0	SE1		
		168	> 50%	BRK		5 Outside	137	0	SE1		
		AVG:		168				AVG:	137		
STD. DEV.		2			STD. DEV.	6					
DS- 4 P36/P37	81264	165	> 50%	BRK	120	1 Outside	125	0	SE1	91	
		167	> 50%	BRK		2 Outside	124	0	SE1		
		167	> 50%	BRK		3 Outside	123	0	SE1		
		169	> 50%	BRK		4 Outside	130	0	SE1		
		168	> 50%	BRK		5 Outside	127	0	SE1		
		AVG:		167				AVG:	126		
STD. DEV.		1			STD. DEV.	3					
AVG:		167			AVG:	133					
STD. DEV.		1			STD. DEV.	3					

**BREAK DESCRIPTION (ASTM D6392 FUSION):**

AD ADHESION FAILURE.  
BRK BREAK IN SHEETING.  
SE1 BREAK AT OUTER EDGE OF SEAM.  
SE2 BREAK AT INNER EDGE OF SEAM.  
AD-BRK BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.  
SIP SEPARATION IN THE PLANE OF THE SHEET.

**EXTRUSION:**

AD1  
AD2  
AD-WLD  
SE1  
SE2  
SE3  
BRK1  
BRK2  
AD-BRK  
HT  
SIP

ADHESION FAILURE. SPECIMENS DELAMINATED UNDER THE BEAD.  
ADHESION FAILURE.  
BREAK THROUGH THE FILLET.  
BREAK AT BOTTOM EDGE OF SEAM.  
BREAK AT TOP EDGE OF SEAM.  
BREAK AT BOTTOM EDGE OF SEAM (for PEEL only)  
BREAK IN BOTTOM SHEETING.  
BREAK IN TOP SHEETING.  
BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.  
BREAK AT EDGE OF HOT TACK  
SEPARATION IN THE PLANE OF THE SHEET.

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Precision Geosynthetic Laboratories International



**TABLE 3.  
SEAM PEEL AND SHEAR TEST RESULTS**

CLIENT: **Zero Energy Institute**  
PROJECT: **Hawes Composting Facility**  
DATE REC'D: **4-May-12**

MATERIAL: **60mil HDPE SEAM**  
SEAM TYPE: **Fusion Weld**  
PGLI JOB #: **G120423**

QC'd By: *Maria Espitia*  
TEST METHOD: **ASTM D6392**  
DATE REPORT: **4-May-12**

Crosshead Speed: 2 in/min						Crosshead Speed: 2 in/min					
SAMPLE ID	PGLI CONTROL #	SHEAR EVALUATION				PROJECT SPEC. (lb/in width)	PEEL EVALUATION				
		MAXIMUM STRENGTH (lb/in width)	% Elongation	Locus of Break	SPECIMEN NUMBER		MAXIMUM STRENGTH (lb/in width)	% INCURSION (%)	LOCUS OF BREAK	PROJECT SPEC. (lb/in width)	
DS- 5 P16/P41	81265	168	> 50%	BRK	120	1 Outside	133	0	SE1	91	
		165	> 50%	BRK		2 Outside	130	0	SE1		
		165	> 50%	BRK		3 Outside	127	0	SE1		
		167	> 50%	BRK		4 Outside	135	0	SE1		
		166	> 50%	BRK		5 Outside	136	0	SE1		
		<b>AVG:</b>	<b>166</b>					<b>133</b>			
<b>STD. DEV.</b>	<b>1</b>				<b>6</b>						
DS- 6 P51/P52	81266	163	> 50%	BRK	120	1 Outside	141	0	SE1	91	
		164	> 50%	BRK		2 Outside	129	0	SE1		
		164	> 50%	BRK		3 Outside	130	0	SE1		
		167	> 50%	BRK		4 Outside	127	0	SE1		
		163	> 50%	BRK		5 Outside	136	0	SE1		
		<b>AVG:</b>	<b>164</b>					<b>133</b>			
<b>STD. DEV.</b>	<b>2</b>				<b>6</b>						

<b>BREAK DESCRIPTION (ASTM D6392 FUSION):</b>	<b>EXTRUSION:</b>	AD1	ADHESION FAILURE. SPECIMENS DELAMINATED UNDER THE BEAD.
AD	ADHESION FAILURE.	AD2	ADHESION FAILURE.
BRK	BREAK IN SHEETING.	AD-WLD	BREAK THROUGH THE FILLET.
SE1	BREAK AT OUTER EDGE OF SEAM.	SE1	BREAK AT BOTTOM EDGE OF SEAM.
SE2	BREAK AT INNER EDGE OF SEAM.	SE2	BREAK AT TOP EDGE OF SEAM.
AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.	SE3	BREAK AT BOTTOM EDGE OF SEAM (for PEEL only)
SIP	SEPARATION IN THE PLANE OF THE SHEET.	BRK1	BREAK IN BOTTOM SHEETING.
		BRK2	BREAK IN TOP SHEETING.
		AD-BRK	BREAK IN FIRST SEAM AFTER SOME ADHESION FAILURE.
		HT	BREAK AT EDGE OF HOT TACK
		SIP	SEPARATION IN THE PLANE OF THE SHEET.

By accepting the data and results presented on this report, the Client agrees to limit the liability of Precision Geosynthetic Laboratories from Client and all other parties for claims on issues, due to the use of this data, to the cost for the respective tests presented in this report, and the Client agrees to indemnify and hold harmless Precision Geosynthetic Laboratories from and against all liabilities in excess of the aforementioned limit.

**Appendix F**  
**ZEI CQA Daily Summary Reports**  
**and Photo Documentation**

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**

Location:	San Bernardino County	Owner:	Nursery Products
CM:	Nursery Products	General:	Quantum
Engineer:	Geosyntec Consultants	Installer:	EC Applications Inc
Inspection CQA:	Zero Energy Institute	Prepared by:	James Hansen
Submitted to:	Nursery Products		

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**Report No.** 1

**Report Date** **Thursday** February 9 2012

**Onsite:** 2:00pm to 5:30pm

**Weather:** AM: Clear, Warm, Low Winds

PM: warm and breeze at 75 degree

**CQA Personnel:** ZEI CQA Personnel: James Hansen

**Hawes Composting Facility: Work Performed:**

- On-site at 2:00 pm, clear and breeze at 75 degrees.
- Quantum continued to clear and grubbing organic from surface impoundment pond A and B. Water trucks are moisture conditioning soil that is going to be used for engineered fill.
- Off-site at 5:30 pm.

**Personnel:**

Quantum: (2)-laborers, (1) Superintendent, (5) Operator

EC Applications Inc: (0) Superintendent, (0) laborer, (0) operators

ZEI CQA: James Hansen

Equipment: (1) John Deere Blade. (2) 623 Scrappers. (2) Water Trucks.

**Meetings, Action Items and Resolutions:**

- ZEI was on site to attend turtle training.

**Action Item:**  **Action Correction Item:** **Attachments:** Photo's

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Water truck moisture conditioning soil**



**Clear and Grubbing on Surface Impoundment Pond**

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**

Location:	San Bernardino County	Owner:	Nursery Products
CM:	Nursery Products	General:	Quantum
Engineer:	Geosyntec Consultants	Installer:	EC Applications Inc
Inspection CQA:	Zero Energy Institute	Prepared by:	James Hansen
Submitted to:	Nursery Products		

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**Report No.** 2

**Report Date** **Monday** February 13 2012

**Onsite:** 9:00am to 2:30pm

**Weather:** AM: Clear, Warm, Low Winds

PM: warm and breeze at 73 degree

**CQA Personnel:** ZEI CQA Personnel: James Hansen

**Hawes Composting Facility: Work Performed:**

- On-site at 9:00 am, clear and breeze at 73 degrees.
- Quantum continued to clear and grubbing organic from surface impoundment pond A and B. Water trucks are moisture conditioning soil that is going to be used for engineered fill.
- Quantum began scarifying sub grade 12" and compacting to 90% with two 623 scrapers wheel rolling. Then placing fill material on the East side of composting area where fill was needed and compacting with two 623 scrapers wheel rolling material.
- Off-site at 2:30 pm.

**Personnel:**

Quantum: (2)-laborers, (1) Superintendent, (5) Operator

EC Applications Inc: (0) Superintendent, (0) laborer, (0) operators

ZEI CQA: James Hansen

Equipment: (1) John Deere Blade. (2) 623 Scrapers. (2) Water Trucks.

**Meetings, Action Items and Resolutions:**

- None.

**Action Item:**  **Action Correction Item:** **Attachments:** Photo's

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Water truck moisture conditioning soil**



**Blade scarifying sub grade**

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**

Location:	San Bernardino County	Owner:	Nursery Products
CM:	Nursery Products	General:	Quantum
Engineer:	Geosyntec Consultants	Installer:	EC Applications Inc
Inspection CQA:	Zero Energy Institute	Prepared by:	James Hansen
Submitted to:	Nursery Products		

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**Report No.** 3

**Report Date** **Wednesday** February 15 2012

**Onsite:** 10:30am to 4:00pm

**Weather:** AM: Overcast, Cold, and High Winds

PM: cold and windy at 52 degree

**CQA Personnel:** ZEI CQA Personnel: James Hansen

**Hawes Composting Facility: Work Performed:**

- On-site at 10:30 am, cold and windy at 52 degrees.
- Quantum began removing material from surface impoundment pond B. Water trucks are moisture conditioning soil that is going to be used for engineered fill on the East side of composting area where fill is needed. Two 623 scappers are placing material on the east side and compacting material by wheel rolling to 90% compacting. Between compacted lifts blade is scarifying and wind rolling dry material to moisture conditioned.
- Off-site at 4:00 pm.

**Personnel:**

Quantum: (2)-laborers, (1) Superintendent, (5) Operator

EC Applications Inc: (0) Superintendent, (0) laborer, (0) operators

ZEI CQA: James Hansen

Equipment: (1) John Deere Blade. (2) 623 Scappers. (2) Water Trucks.

**Meetings, Action Items and Resolutions:**

- None.

**Action Item:**  **Action Correction Item:** **Attachments:** Photo's

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Water truck moisture conditioning material and scraper is removing from pond B**



**Blade wind rolling material in east fill area**

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Two 623 scrapers placing fill material on the East side**

# ZERO ENERGY INSTITUTE

## CQA DAILY SUMMARY REPORT

### Hawes Composting Facility

Location:	San Bernardino County	Owner:	Nursery Products
CM:	Nursery Products	General:	Quantum
Engineer:	Geosyntec Consultants	Installer:	EC Applications Inc
Inspection CQA:	Zero Energy Institute	Prepared by:	James Hansen
Submitted to:	Nursery Products		

**Report No.** 4

**Report Date** **Thursday** February 16 2012

**Onsite:** 9:00am to 4:00pm

**Weather:** AM: Overcast, Cold, and High Winds

PM: cold and windy at 54 degree

**CQA Personnel:** ZEI CQA Personnel: James Hansen

#### **Hawes Composting Facility: Work Performed:**

- On-site at 9:00 am, cold and windy at 54 degrees.
- Quantum continued removing material from surface impoundment pond B. Water trucks are moisture conditioning soil that is going to be used for engineered fill on the East side of composting area where fill is needed. Two 623 scrapers are placing material on the east side and compacting material by wheel rolling to 90% compacting. Between compacted lifts blade is scarifying and wind rolling dry material to moisture conditioned.
- Off-site at 4:00 pm.

#### **Personnel:**

Quantum: (2)-laborers, (1) Superintendent, (5) Operator

EC Applications Inc: (0) Superintendent, (0) laborer, (0) operators

ZEI CQA: James Hansen

Equipment: (1) John Deere Blade. (2) 623 Scrapers. (2) Water Trucks.

#### **Meetings, Action Items and Resolutions:**

- None.

**Action Item:**  **Action Correction Item:** **Attachments:** Photo's

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Water truck moisture conditioning material in pond B**



**Blade wind rolling material in East fill area**

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Two 623 scrapers placing fill material on the East side**



**623 scrapper removing material from pond B**

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**

Location:	San Bernardino County	Owner:	Nursery Products
CM:	Nursery Products	General:	Quantum
Engineer:	Geosyntec Consultants	Installer:	EC Applications Inc
Inspection CQA:	Zero Energy Institute	Prepared by:	James Hansen
Submitted to:	Nursery Products		

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**Report No.** 5

**Report Date** **Monday** February 20 2012

**Onsite:** 6:30am to 3:00pm

**Weather:** AM: Clear, Cold, and low Winds

PM: cold and breeze at 34 degree

**CQA Personnel:** ZEI CQA Personnel: James Hansen

**Hawes Composting Facility: Work Performed:**

- On-site at 6:30 am, cold and windy at 34 degrees.
- Quantum continued removing material from surface impoundment pond B. Water trucks are moisture conditioning soil that is going to be used for engineered fill on the East side of composting area where fill is needed. Two 623 scappers are placing material on the east side and compacting material by wheel rolling to 90% compacting. Between compacted lifts blade is scarifying and wind rolling dry material to moisture conditioned.
- Sladden Engineering was on-site to perform nuclear density tests on fill placed on the East side of composting area.
- Off-site at 3:00 pm.

**Personnel:**

Quantum: (2)-laborers, (1) Superintendent, (5) Operator

EC Applications Inc: (0) Superintendent, (0) laborer, (0) operators

ZEI CQA: James Hansen

Equipment: (1) John Deere Blade. (2) 623 Scappers. (2) Water Trucks.

**Meetings, Action Items and Resolutions:**

- None.

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

**Hawes Composting Facility**

**Action Item:**  **Action Correction Item:** **Attachments:** Photo's



**Water truck moisture conditioning material in pond B**



**Blade wind rolling material in East fill area**

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Two 623 scrapers placing fill material on the East side**



**623 scrapper removing material from pond B**

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Testing soil placed on the East side of composting area**

# ZERO ENERGY INSTITUTE

## CQA DAILY SUMMARY REPORT

### Hawes Composting Facility

Location:	San Bernardino County	Owner:	Nursery Products
CM:	Nursery Products	General:	Quantum
Engineer:	Geosyntec Consultants	Installer:	EC Applications Inc
Inspection CQA:	Zero Energy Institute	Prepared by:	James Hansen
Submitted to:	Nursery Products		

**Report No.** 6

**Report Date** Tuesday February 21 2012

**Onsite:** 8:00am to 3:00pm

**Weather:** AM: Clear, Cold, and low Winds

PM: cold and breeze at 35 degree

**CQA Personnel:** ZEI CQA Personnel: James Hansen

#### Hawes Composting Facility: Work Performed:

- On-site at 8:00 am, cold and windy at 35 degrees.
- Quantum continued removing material from surface impoundment pond B. Water trucks are moisture conditioning soil that is going to be used for engineered fill on the East side of composting area where fill is needed. Two 623 scrapers are placing material on the east side and compacting material by wheel rolling to 90% compacting. Between compacted lifts blade is scarifying and wind rolling dry material to moisture conditioned.
- Off-site at 3:00 pm.

#### **Personnel:**

Quantum: (2)-laborers, (1) Superintendent, (5) Operator

EC Applications Inc: (0) Superintendent, (0) laborer, (0) operators

ZEI CQA: James Hansen

Equipment: (1) John Deere Blade, (2) 623 Scrapers, (2) Water Trucks, (1) Smooth drum roller, (1) Back-hoe.

#### **Meetings, Action Items and Resolutions:**

- None.

**Action Item:**  **Action Correction Item:** **Attachments:** Photo's

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Water truck moisture conditioning material in pond B**



**Blade wind rolling material in East fill area**

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

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## **Hawes Composting Facility**



**Two 623 scrapers placing fill material on the East side**



**623 scrapers removing material from pond B**

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**

Location:	San Bernardino County	Owner:	Nursery Products
CM:	Nursery Products	General:	Quantum
Engineer:	Geosyntec Consultants	Installer:	EC Applications Inc
Inspection CQA:	Zero Energy Institute	Prepared by:	James Hansen
Submitted to:	Nursery Products		

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**Report No.** 7

**Report Date** **Wednesday** February 22 2012

**Onsite:** 9:00am to 4:00pm

**Weather:** AM: Clear, Warm, and low Winds

PM: Warm and breeze at 50 degree

**CQA Personnel:** ZEI CQA Personnel: James Hansen

**Hawes Composting Facility: Work Performed:**

- On-site at 9:00 am, Warm and windy at 50 degrees.
- Quantum continued removing material from surface impoundment pond B. Water trucks are moisture conditioning soil that is going to be used for engineered fill on the East side of composting area where fill is needed. Two 623 scrapers are placing material on the east side and compacting material by wheel rolling to 90% compacting. Between compacted lifts blade is scarifying and wind rolling dry material to moisture conditioned.
- EC Application on-site to unload 44 rolls of GCL that were being delivered to site.
- Off-site at 4:00 pm.

**Personnel:**

Quantum: (2)-laborers, (1) Superintendent, (5) Operator

EC Applications Inc: (1) Superintendent, (0) laborer, (0) operators

ZEI CQA: James Hansen

Equipment: (1) John Deere Blade, (2) 623 Scrapers, (2) Water Trucks, (1) Smooth drum roller, (1) Back-hoe, (1) Fork Lift.

**Meetings, Action Items and Resolutions:**

- None.

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**

**Action Item:**  **Action Correction Item:** **Attachments:** Photo's



**Water truck moisture conditioning material placed on the east**



**Blade wind rolling material in East fill area**

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Two 623 scrappers placing fill material on the East side**



**623 scrappers removing material from pond B**

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Truck delivering GCL to site**



**Forklift unloading truck GCL**

# ZERO ENERGY INSTITUTE

## CQA DAILY SUMMARY REPORT

### Hawes Composting Facility

Location:	San Bernardino County	Owner:	Nursery Products
CM:	Nursery Products	General:	Quantum
Engineer:	Geosyntec Consultants	Installer:	EC Applications Inc
Inspection CQA:	Zero Energy Institute	Prepared by:	James Hansen
Submitted to:	Nursery Products		

**Report No.** 8

**Report Date** **Thursday** February 23 2012

**Onsite:** 9:00am to 5:00pm

**Weather:** AM: Clear, Warm, and low Winds

PM: Warm and breeze at 55 degree

**CQA Personnel:** ZEI CQA Personnel: James Hansen

#### **Hawes Composting Facility: Work Performed:**

- On-site at 9:00 am, Warm and windy at 55 degrees.
- Quantum continued removing material from surface impoundment pond B and began removing soil from pond A. Water trucks are moisture conditioning soil that is going to be used for engineered fill on the East side of composting area where fill is needed. Two 623 scrapers are placing material on the east side and compacting material by wheel rolling to 90% compacting. Between compacted lifts blade is scarifying and wind rolling dry material to moisture conditioned.
- EC Application on-site to unload 48 rolls of GCL and 21 rolls of HDPE that were being delivered to site.
- Off-site at 4:00 pm.

#### **Personnel:**

Quantum: (2)-laborers, (1) Superintendent, (5) Operator

EC Applications Inc: (1) Superintendent, (0) laborer, (0) operators

ZEI CQA: James Hansen

Equipment: (1) John Deere Blade, (2) 623 Scrapers, (2) Water Trucks, (1) Smooth drum roller, (1) Back-hoe, (1) Fork Lift.

#### **Meetings, Action Items and Resolutions:**

- None.

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**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**

**Action Item:**  **Action Correction Item:** **Attachments:** **Photo's**



**Water truck moisture conditioning material placed on the east**



**623 scrapers removing material from pond A**

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Two 623 scrapers placing fill material on the East side**



**623 scrapers removing material from pond B**

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Forklift unloading truck GCL**



**Forklift unloading truck HDPE**

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**

Location:	San Bernardino County	Owner:	Nursery Products
CM:	Nursery Products	General:	Quantum
Engineer:	Geosyntec Consultants	Installer:	EC Applications Inc
Inspection CQA:	Zero Energy Institute	Prepared by:	James Hansen
Submitted to:	Nursery Products		

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**Report No.** 9

**Report Date** **Monday** February 27 2012 **Onsite:** 6:30am to 5:00pm

**Weather:** AM: Clear, Cold, and low Winds PM: Cold and breeze at 40 degree

**CQA Personnel:** ZEI CQA Personnel: James Hansen

**Hawes Composting Facility: Work Performed:**

- On-site at 6:30 am, cold and windy at 40 degrees.
- Quantum continued removing material from surface impoundment pond A. Water trucks are moisture conditioning soil that is going to be used for engineered fill on the East side of composting area where fill is needed. Two 623 scrapers are placing material on the east side and compacting material by wheel rolling to 90% compacting. Between compacted lifts blade is scarifying and wind rolling dry material to moisture conditioned.
- Quantum began ripping and moisture conditioning cell floor of pond B. Blade is grading slopes to six inches above grade to be ripped, moisture conditioned, and recompact to 90%.
- Off-site at 5:00 pm.

**Personnel:**

Quantum: (2)-laborers, (1) Superintendent, (5) Operator

EC Applications Inc: (1) Superintendent, (0) laborer, (0) operators

ZEI CQA: James Hansen

Equipment: (1) John Deere Blade, (2) 623 Scrapers, (2) Water Trucks, (1) Smooth drum roller, (1) Back-hoe, (1) Fork Lift.

**Meetings, Action Items and Resolutions:**

- None.

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**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**

**Action Item:**  **Action Correction Item:** **Attachments:** Photo's



**Water truck moisture conditioning material placed on the east**



**623 scrapper removing material from pond A**

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Removing soil from slope of pond B**



**Two 623 scrapers placing fill material on the East side**

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**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Ripping cell floor of pond B**

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**

Location:	San Bernardino County	Owner:	Nursery Products
CM:	Nursery Products	General:	Quantum
Engineer:	Geosyntec Consultants	Installer:	EC Applications Inc
Inspection CQA:	Zero Energy Institute	Prepared by:	James Hansen
Submitted to:	Nursery Products		

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**Report No.** 10

**Report Date** **Wednesday** February 29 2012

**Onsite:** 8:00am to 5:00pm

**Weather:** AM: Clear, Cold, and low Winds

PM: Cold and breeze at 42 degree

**CQA Personnel:** ZEI CQA Personnel: James Hansen

**Hawes Composting Facility: Work Performed:**

- On-site at 6:30 am, cold and windy at 42 degrees.
- Quantum continued removing material from surface impoundment pond A. Water trucks are moisture conditioning soil that is going to be used for engineered fill on the East side of composting area where fill is needed. Two 623 scrapers are placing material on the east side and compacting material by wheel rolling to 90% compacting. Between compacted lifts blade is scarifying and wind rolling dry material to be moisture conditioned.
- Quantum continued ripping and moisture conditioning cell slopes and floor of pond B. Smooth drum roller is compacting cell floor to 90%.
- Quantum began digging Lysimeter sump and compacting sub grade of Lysimeter sump to 90% compacting.
- Sladden Engineering was on-site testing east composting fill area and cell floor of pond B.
- Off-site at 5:00 pm.

**Personnel:**

Quantum: (2)-laborers, (1) Superintendent, (5) Operator

EC Applications Inc: (0) Superintendent, (0) laborer, (0) operators

ZEI CQA: James Hansen

Equipment: (1) John Deere Blade, (2) 623 Scrapers, (2) Water Trucks, (1) Smooth drum roller, (1) Back-hoe, (1) Fork Lift.

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

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## **Hawes Composting Facility**

**Meetings, Action Items and Resolutions:**

- Sladden Engineering and ZEI attended tortoise training with biologist from Nursery Products.

**Action Item:**  **Action Correction Item:** **Attachments:** **Photo's**



**Water truck moisture conditioning material in pond A**



**623 scrapper removing material from pond A**

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Ripping slopes of pond B**



**Smooth drum rolling cell floor of pond B**

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

---

**Hawes Composting Facility**



**Ripping cell floor of pond B**



**Compacting soil under Lysimeter Sump in pond B**

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**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Moisture conditioning slopes of pond B**

# ZERO ENERGY INSTITUTE

## CQA DAILY SUMMARY REPORT

### Hawes Composting Facility

Location:	San Bernardino County	Owner:	Nursery Products
CM:	Nursery Products	General:	Quantum
Engineer:	Geosyntec Consultants	Installer:	EC Applications Inc
Inspection CQA:	Zero Energy Institute	Prepared by:	James Hansen
Submitted to:	Nursery Products		

**Report No.** 11

**Report Date** **Wednesday** March 1 2012

**Onsite:** 8:30am to 3:00pm

**Weather:** AM: Clear, Cold, and High Winds

PM: Cold and windy at 41 degree

**CQA Personnel:** ZEI CQA Personnel: James Hansen

#### **Hawes Composting Facility: Work Performed:**

- On-site at 6:30 am, cold and windy at 41 degrees.
- Quantum continued removing material from surface impoundment pond A. Water trucks are moisture conditioning soil that is going to be used for engineered fill on the East side of composting area where fill is needed. Two 623 scappers are placing material on the east side and compacting material by wheel rolling to 90% compacting. Between compacted lifts blade is scarifying and wind rolling dry material to be moisture conditioned.
- Quantum continued ripping and moisture conditioning cell slopes of pond B. D4 Dozer is compacting slopes to 90%.
- Quantum continued digging Lysimeter sump in pond B.
- Off-site at 3:00 pm.

#### **Personnel:**

Quantum: (2)-laborers, (1) Superintendent, (5) Operator

EC Applications Inc: (0) Superintendent, (0) laborer, (0) operators

ZEI CQA: James Hansen

Equipment: (1) John Deere Blade, (2) 623 Scappers, (2) Water Trucks, (1) Smooth drum roller, (1) Back-hoe, (1) Fork Lift, (1) John Deere D4 Dozer.

#### **Meetings, Action Items and Resolutions:**

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

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## **Hawes Composting Facility**

- Sladden Engineering and ZEI attended tortoise training with biologist from Nursery Products.

**Action Item:**  **Action Correction Item:** **Attachments:** **Photo's**



**Water truck moisture conditioning slopes of pond B**



**623 scrapper removing material from pond A**

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Compacting slopes of pond B with D4 dozer**



**Removing soil from Lysimeter sump in pond B**

# ZERO ENERGY INSTITUTE

## CQA DAILY SUMMARY REPORT

### Hawes Composting Facility

Location:	San Bernardino County	Owner:	Nursery Products
CM:	Nursery Products	General:	Quantum
Engineer:	Geosyntec Consultants	Installer:	EC Applications Inc
Inspection CQA:	Zero Energy Institute	Prepared by:	James Hansen
Submitted to:	Nursery Products		

**Report No.** 12

**Report Date** **Wednesday** March 4 2012

**Onsite:** 8:00am to 3:00pm

**Weather:** AM: Clear, Warm, and Low Winds

PM: Cold and breeze at 47 degree

**CQA Personnel:** ZEI CQA Personnel: James Hansen

#### **Hawes Composting Facility: Work Performed:**

- On-site at 6:30 am, warm and windy at 47 degrees.
- Quantum continued removing material from surface impoundment pond A. Water trucks are moisture conditioning soil that is going to be used for engineered fill on the East side of composting area where fill is needed. Two 623 scrapers are placing material on the east side and compacting material by wheel rolling to 90% compacting. Between compacted lifts blade is scarifying and wind rolling dry material to be moisture conditioned.
- Quantum continued ripping and moisture conditioning cell slopes of pond B. D4 Dozer is compacting slopes to 90%.
- Quantum began replacing and compacting material in Lysimeter sump in pond B due to sand material in Lysimeter sump.
- Off-site at 3:00 pm.

#### **Personnel:**

Quantum: (2)-laborers, (1) Superintendent, (5) Operator

EC Applications Inc: (0) Superintendent, (0) laborer, (0) operators

ZEI CQA: James Hansen

Equipment: (1) John Deere Blade, (2) 623 Scrapers, (2) Water Trucks, (1) Smooth drum roller, (1) Back-hoe, (1) Fork Lift, (1) John Deere D4 Dozer.

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

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## **Hawes Composting Facility**

**Meetings, Action Items and Resolutions:**

- Sladden Engineering and ZEI attended tortoise training with biologist from Nursery Products.

**Action Item:**  **Action Correction Item:** **Attachments:** **Photo's**



**Water truck moisture conditioning slopes of pond B**



**Replacing and compacting soil in Lysimeter sump in pond B**

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**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Compacting slopes of pond B with D4 dozer**



**Placing soil for Lysimeter sump back fill in pond B**

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## CQA DAILY SUMMARY REPORT

### Hawes Composting Facility

Location:	San Bernardino County	Owner:	Nursery Products
CM:	Nursery Products	General:	Quantum
Engineer:	Geosyntec Consultants	Installer:	EC Applications Inc
Inspection CQA:	Zero Energy Institute	Prepared by:	James Hansen
Submitted to:	Nursery Products		

**Report No.** 13

**Report Date** **Wednesday** March 5 2012

**Onsite:** 8:00am to 4:00pm

**Weather:** AM: Clear, Warm, and low Winds

PM: warm and breeze at 47 degree

**CQA Personnel:** ZEI CQA Personnel: James Hansen

#### **Hawes Composting Facility: Work Performed:**

- On-site at 8:00 am, warm and breeze at 47 degrees.
- Quantum continued removing material from surface impoundment pond A. Water trucks are moisture conditioning soil that is going to be used for engineered fill on the East side of composting area where fill is needed. Two 623 scrapers are placing material on the east side and compacting material by wheel rolling to 90% compacting. Between compacted lifts blade is scarifying and wind rolling dry material to be moisture conditioned.
- Quantum continued moisture conditioning slopes and floor of pond B. Smooth drum roller is compacting slopes and cell floor to 90%.
- Quantum began racking slopes and floor of pond B to prepare sub grade for HDPE deployment.
- Sladden Engineering was on-site testing east fill area, pond B slopes, pond B cell floor, and pond B Lysimeter sump sub grade.
- EC Applications filling sand bag for HDPE deployment.
- Off-site at 4:00 pm.

#### **Personnel:**

Quantum: (2)-laborers, (1) Superintendent, (5) Operator

EC Applications Inc: (1) Superintendent, (5) laborer, (0) operators

ZEI CQA: James Hansen

Equipment: (1) John Deere Blade, (2) 623 Scrapers, (2) Water Trucks, (1) Smooth drum roller, (1) Back-hoe, (1) Fork Lift.

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

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## **Hawes Composting Facility**

**Meetings, Action Items and Resolutions:**

- EC Applications attended tortoise training with biologist from Nursery Products.

**Action Item:**  **Action Correction Item:** **Attachments:** **Photo's**



**Water truck moisture conditioning slopes of pond B**



**623 scrapper removing material from pond A**

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Smooth drum rolling slopes of pond B**



**Smooth drum rolling cell floor of pond B**

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**Hawes Composting Facility**



**Nuclear density testing slope of pond B**



**Racking sub grade of pond B**

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**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Moisture conditioning slopes of pond B**



**Filling sandbags for HDPE deployment**

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**

Location:	San Bernardino County	Owner:	Nursery Products
CM:	Nursery Products	General:	Quantum
Engineer:	Geosyntec Consultants	Installer:	EC Applications Inc
Inspection CQA:	Zero Energy Institute	Prepared by:	James Hansen
Submitted to:	Nursery Products		

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**Report No.** 14

**Report Date** **Wednesday** March 7 2012

**Onsite:** 9:00am to 4:00pm

**Weather:** AM: Clear, Warm, and low Winds

PM: warm and breeze at 42 degree

**CQA Personnel:** ZEI CQA Personnel: James Hansen

**Hawes Composting Facility: Work Performed:**

- On-site at 9:00 am, warm and breeze at 42 degrees.
- Quantum continued removing material from surface impoundment pond A. Water trucks are moisture conditioning soil that is going to be used for engineered fill on the East side of composting area where fill is needed. Two 623 scrapers are placing material on the east side and compacting material by wheel rolling to 90% compacting. Between compacted lifts blade is scarifying and wind rolling dry material to be moisture conditioned.
- Quantum continued moisture conditioning slopes and floor of pond B. Smooth drum roller is compacting slopes and cell floor to 90%.
- Quantum continued racking slopes and floor of pond B to prepare sub grade for HDPE deployment.
- Off-site at 4:00 pm.

**Personnel:**

Quantum: (2)-laborers, (1) Superintendent, (5) Operator

EC Applications Inc: (0) Superintendent, (0) laborer, (0) operators

ZEI CQA: James Hansen

Equipment: (1) John Deere Blade, (2) 623 Scrapers, (2) Water Trucks, (1) Smooth drum roller, (1) Back-hoe, (1) Fork Lift.

**Meetings, Action Items and Resolutions:**

- None.

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**CQA DAILY SUMMARY REPORT**

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## **Hawes Composting Facility**

**Action Item:**  **Action Correction Item:** **Attachments:** Photo's



**Preparing sub grade of pond B**



**623 scrapers removing material from pond A**

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Smooth drum rolling anchor trench of pond B**



**Racking sub grade of pond B**

# ZERO ENERGY INSTITUTE

## CQA DAILY SUMMARY REPORT

### Hawes Composting Facility

Location:	San Bernardino County	Owner:	Nursery Products
CM:	Nursery Products	General:	Quantum
Engineer:	Geosyntec Consultants	Installer:	EC Applications Inc
Inspection CQA:	Zero Energy Institute	Prepared by:	James Hansen
Submitted to:	Nursery Products		

**Report No.** 15

**Report Date** **Wednesday** March 8 2012

**Onsite:** 7:00am to 5:00pm

**Weather:** AM: Clear, Cold, and low Winds

PM: warm and breeze at 34 degree

**CQA Personnel:** ZEI CQA Personnel: James Hansen

#### Hawes Composting Facility: Work Performed:

- On-site at 9:00 am, cold and breeze at 34 degrees.
- Quantum continued moisture conditioning slopes and floor of pond B. Smooth drum roller is compacting slopes and cell floor to 90%.
- Quantum continued racking slopes and floor of pond B to prepare sub grade for HDPE deployment.
- Quantum began digging 1<sup>st</sup> and 2<sup>nd</sup> anchor trench in the bottom of pond B.
- EC Applications INC. places 27,300 SF (13-rolls) of GCL. EC began to detail GCL placed on approved subgrade. EC places GCL and secures panels in anchor trench 1 and 2 in pond B with a 12" overlap with bentonite on but seam that do not have super groove.
- EC Applications INC. places HDPE liner on top of GCL in anchor trench 1 and 2 in Pond B.
- EC Applications INC. Wedge Welding and Panel Deployment Summary: No change

1. Previous Seam Total: 0 – Feet
2. 01/12/12 Total: 0 – Feet
3. Cumulative Seam Total: 0 - Feet
4. Previous EC installed Total SF: 0 - SF
5. 01/12/12 Installed: 0 - SF
6. Cumulative Liner Installed: 0 - SF

- Off-site at 4:00 pm.

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

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## Hawes Composting Facility

**Personnel:**

Quantum: (2)-laborers, (1) Superintendent, (5) Operator

EC Applications Inc: (0) Superintendent, (0) laborer, (0) operators

ZEI CQA: James Hansen

Equipment: (1) John Deere Blade, (2) 623 Scrappers, (2) Water Trucks, (1) Smooth drum roller, (1) Back-hoe, (1) Fork Lift.

**Meetings, Action Items and Resolutions:**

- None.

**Action Item:**  **Action Correction Item:** **Attachments:** Photo's



**Preparing sub grade of pond B**

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**623 scrapers removing material from pond A**



**Smooth drum rolling anchor trench of pond B**

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Racking sub grade of pond B**

# ZERO ENERGY INSTITUTE

## CQA DAILY SUMMARY REPORT

### Hawes Composting Facility

Location:	San Bernardino County	Owner:	Nursery Products
CM:	Nursery Products	General:	Quantum
Engineer:	Geosyntec Consultants	Installer:	EC Applications Inc
Inspection CQA:	Zero Energy Institute	Prepared by:	James Hansen
Submitted to:	Nursery Products		

**Report No.** 16

**Report Date** Friday March 9 2012

**Onsite:** 6:00am to 6:30pm

**Weather:** AM: Clear, Cold, and low Winds

PM: warm and breeze at 74 degree

**CQA Personnel:** ZEI CQA Personnel: James Hansen

#### Hawes Composting Facility: Work Performed:

- On-site at 6:00 am, cold and breeze at 34 degrees.
- Quantum continued moisture conditioning slopes and floor of pond B. Smooth drum roller is compacting slopes and cell floor to 90%.
- Quantum continued racking slopes and floor of pond B to prepare sub grade for HDPE deployment.
- Quantum began digging and compacting subgrade of Lysimeter sump in the bottom of pond B.
- EC Applications INC. places 27,300 SF (13-rolls) of GCL. EC began to detail GCL placed on approved subgrade. EC places GCL and secures panels in Lysimeter sump, 1<sup>st</sup> anchor trench to the East slope, North to South slope and cell floor between 1<sup>st</sup> and 2<sup>nd</sup> anchor trench in pond B with a 12" overlap with bentonite on but seam that do not have super groove.
- EC Applications INC. places HDPE liner on top of GCL in Lysimeter sump, 1<sup>st</sup> anchor trench to the East slope, North to South slope and cell floor between 1<sup>st</sup> and 2<sup>nd</sup> anchor trench in Pond B.
- EC Applications INC. places 12oz Geotextile on top of HDPE liner in Lysimeter sump in Pond B.
- EC Applications INC. places rock on top of geotextile in Lysimeter sump in pond B.
- EC Applications INC. places geotextile on top of rock in Lysimeter sump in pond B.
- EC Applications INC. Wedge Welding and Panel Deployment Summary: No change
- Off-site at 6:30 pm.

#### **Personnel:**

Quantum: (2)-laborers, (1) Superintendent, (5) Operator

EC Applications Inc: (1) Superintendent, (7) laborer, (2) operators

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**CQA DAILY SUMMARY REPORT**

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## Hawes Composting Facility

ZEI CQA: James Hansen

Equipment: (1) John Deere Blade, (2) 623 Scrappers, (2) Water Trucks, (1) Smooth drum roller, (1) Back-hoe, (1) Fork Lift, (1) Bobcat

**Meetings, Action Items and Resolutions:**

- None.

**Action Item:**  **Action Correction Item:** **Attachments:** Photo's



**Preparing sub grade of pond B**



**Preparing subgrade of Lysimeter sump in pond B**

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**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Placing bentonite in butt seams of GCL placed in pond B**



**Trial weld being pulled for fusion weld**

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**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Placing GCL on the east slope and cell floor in pond B**



**Placing HDPE liner on top of GCL on the east slope and cell floor in pond B**

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**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Air pressure testing fusion welded seam of HDPE liner in pond B**



**Placing GCL on the North to South slope and cell floor between 1<sup>st</sup> and 2<sup>nd</sup> anchor trench in pond B**

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**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Placing HDPE liner on top of GCL on the North to South slope and cell floor between 1<sup>st</sup> and 2<sup>nd</sup> anchor trench in pond B**



**Placing GCL in Lysimeter sump in pond B**

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**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Placing HDPE liner on top of GCL in Lysimeter sump in pond B**



**Placing geotextile and pipe in Lysimeter sump in pond B**

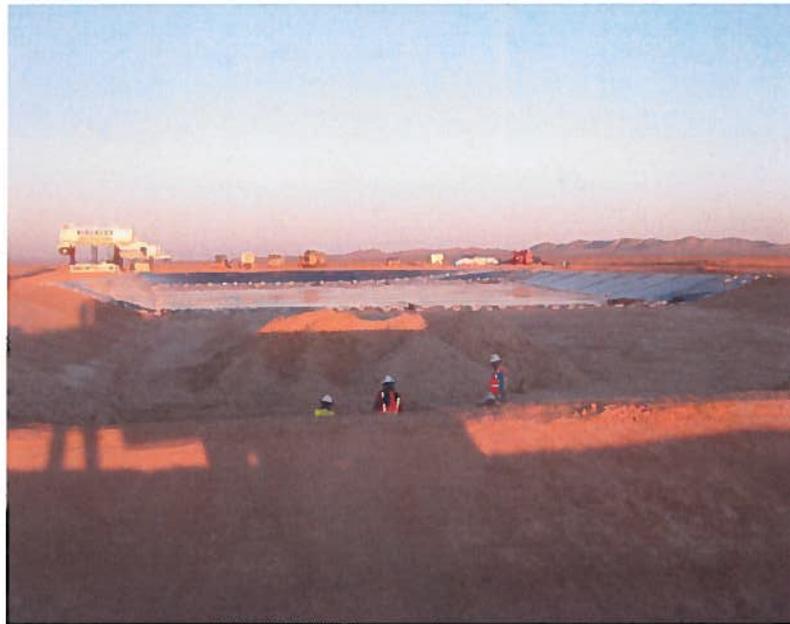
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**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Placing rock back fill on top of 12oz geotextile in Lysimeter sump in pond B**



**Pond B picture from the West side looking to the East side.**

# ZERO ENERGY INSTITUTE

## CQA DAILY SUMMARY REPORT

### Hawes Composting Facility

Location:	San Bernardino County	Owner:	Nursery Products
CM:	Nursery Products	General:	Quantum
Engineer:	Geosyntec Consultants	Installer:	EC Applications Inc
Inspection CQA:	Zero Energy Institute	Prepared by:	James Hansen
Submitted to:	Nursery Products		

**Report No.** 17

**Report Date** **Saturday** March 10 2012

**Onsite:** 6:30am to 4:30pm

**Weather:** AM: Clear, Cold, and low Winds

PM: warm and breeze at 79 degree

**CQA Personnel:** ZEI CQA Personnel: James Hansen

#### **Hawes Composting Facility: Work Performed:**

- On-site at 6:30 am, cold and breeze at 37 degrees.
- Quantum continued removing material from surface impoundment pond A. Water trucks are moisture conditioning soil that is going to be used for engineered fill on the East side of composting area where fill is needed. Two 623 scappers are placing material on the east side and compacting material by wheel rolling to 90% compacting. Between compacted lifts blade is scarifying and wind rolling dry material to be moisture conditioned.
- Quantum continued moisture conditioning slopes and floor of pond B. Smooth drum roller is compacting slopes and cell floor to 90%.
- Quantum continued racking slopes and floor of pond B to prepare sub grade for HDPE deployment.
- Quantum began digging 3<sup>rd</sup> anchor trench in the bottom of pond B.
- Quantum back filling and compacting material placed on top of geotextile in Lysimeter sump in pond B.
- EC Applications INC. places 27,300 SF (13-rolls) of GCL. EC began to detail GCL placed on approved subgrade. EC places GCL and secures panels on North to South slope and cell floor between 2<sup>nd</sup> and 3<sup>rd</sup> anchor trench in pond B with a 12" overlap with bentonite on but seam that do not have super groove.
- EC Applications INC. places HDPE liner on top of GCL on North to South slope and cell floor between 2<sup>nd</sup> and 3<sup>rd</sup> anchor trench in Pond B.
- EC Applications INC. began repairing and vacuum box testing repairs made to HDPE liner.
- EC Applications INC. Wedge Welding and Panel Deployment Summary:

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**CQA DAILY SUMMARY REPORT**

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## Hawes Composting Facility

- Off-site at 4:30 pm.

**Personnel:**

Quantum: (2)-laborers, (1) Superintendent, (5) Operator

EC Applications Inc: (1) Superintendent, (7) laborer, (2) operators

ZEI CQA: James Hansen

Equipment: (1) John Deere Blade, (2) 623 Scrappers, (2) Water Trucks, (1) Smooth drum roller, (1) Back-hoe, (1) Fork Lift, (1) Bobcat

**Meetings, Action Items and Resolutions:**

- None.

**Action Item:**  **Action Correction Item:** **Attachments:** Photo's



**Preparing sub grade of pond B**

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**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Geotextile placed in Lysimeter sump in pond B**

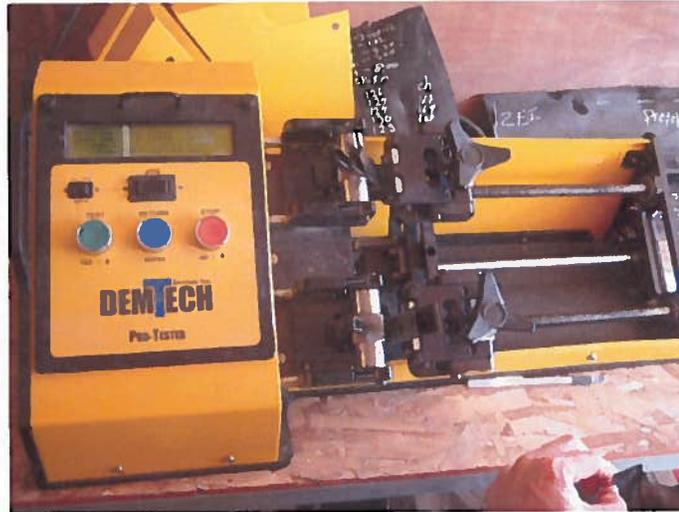


**Placing bentonite in butt seams of GCL placed in pond B**

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**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Trial weld being pulled for fusion weld**



**Placing GCL on the North slope, South slope, cell floor between 2<sup>nd</sup> and 3<sup>rd</sup> anchor trench in pond B**

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**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Placing HDPE liner on the North slope, South slope, cell floor between 2<sup>nd</sup> and 3<sup>rd</sup> anchor trench in pond B**



**Air pressure testing fusion welded seam of HDPE liner in pond B**

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**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Compacting material placed on top of geotextile in Lysimeter sump in pond B**



**Cleaning and fusion welding seam of HDPE liner in pond B**

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**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Extrusion welding repair made to HDPE liner in pond B**



**Vacuum box testing extrusion weld on cap of anchor trench in pond B**

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**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Cap over anchor trench in pond B**



**Digging 3<sup>rd</sup> anchor trench in pond B**

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**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**623 scrapper placing fill material on the East side of compost area**



**Two 623 scrapper removing material from pond A**

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**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Pond B picture from the West side looking to the East side.**

# ZERO ENERGY INSTITUTE

## CQA DAILY SUMMARY REPORT

### Hawes Composting Facility

Location:	San Bernardino County	Owner:	Nursery Products
CM:	Nursery Products	General:	Quantum
Engineer:	Geosyntec Consultants	Installer:	EC Applications Inc
Inspection CQA:	Zero Energy Institute	Prepared by:	James Hansen
Submitted to:	Nursery Products		

**Report No.** 18

**Report Date** **Monday** March 12 2012

**Onsite:** 6:30am to 5:00pm

**Weather:** AM: Clear, Cold, and low Winds

PM: warm and breeze at 76 degree

**CQA Personnel:** ZEI CQA Personnel: James Hansen

#### Hawes Composting Facility: Work Performed:

- On-site at 6:30 am, cold and breeze at 40 degrees.
- Quantum began ripping and moisture conditioning subgrade on the West side fill of composting area.
- Quantum continued moisture conditioning slopes and floor of pond B. Smooth drum roller is compacting slopes and cell floor to 90%.
- Quantum continued racking slopes and floor of pond B to prepare sub grade for HDPE deployment.
- Quantum began digging and compacting subgrade of sump in the bottom of pond B.
- EC Applications INC. places GCL. EC began to detail GCL placed on approved subgrade. EC places GCL and secures panels on North to South slope and cell floor between 2<sup>nd</sup> and 3<sup>rd</sup> anchor trench, on East slope to 3<sup>rd</sup> anchor trench, and in sump in pond B with a 12" overlap with bentonite on but seam that do not have super groove.
- EC Applications INC. places HDPE liner on top of GCL on North to South slope and cell floor between 2<sup>nd</sup> and 3<sup>rd</sup> anchor trench on East slope to 3<sup>rd</sup> anchor trench, and in sump in Pond B.
- EC Applications INC. places 12oz Geotextile on top of HDPE liner in sump in Pond B.
- EC Applications INC. places rock on top of geotextile in sump in pond B.
- EC Applications INC. places geotextile on top of rock in sump in pond B.
- EC Applications INC. continued repairing and vacuum box testing repairs made to HDPE liner.
- EC Applications INC. Wedge Welding and Panel Deployment Summary: No change

Off-site at 5:00 pm.

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**CQA DAILY SUMMARY REPORT**

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## **Hawes Composting Facility**

**Personnel:**

Quantum: (2)-laborers, (1) Superintendent, (5) Operator

EC Applications Inc: (1) Superintendent, (7) laborer, (2) operators

ZEI CQA: James Hansen

Equipment: (1) John Deere Blade, (2) 623 Scrappers, (2) Water Trucks, (1) Smooth drum roller, (1) Back-hoe,  
(1) Fork Lift, (1) Bobcat

**Meetings, Action Items and Resolutions:**

- None.

**Action Item:**  **Action Correction Item:** **Attachments:** Photo'

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**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Compacting and preparing subgrade of sump in pond B**



**Placing bentonite in butt seams of GCL placed in pond B**

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**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Trial weld being pulled for fusion weld**



**Placing GCL on the North slope, South slope, cell floor between 2<sup>nd</sup> and 3<sup>rd</sup> anchor trench in pond B**

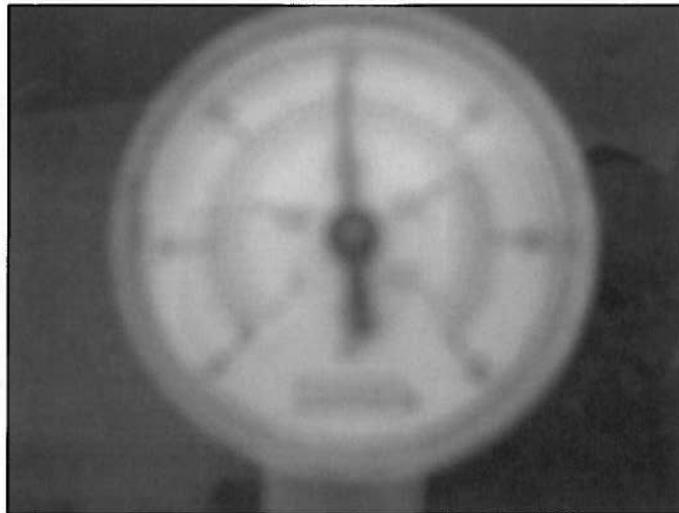
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**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Placing HDPE liner on the North slope, South slope, cell floor between 2<sup>nd</sup> and 3<sup>rd</sup> anchor trench in pond B**



**Air pressure testing fusion welded seam of HDPE liner in pond B**

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**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Compacting back fill material in anchor trench # 3 in pond B**



**Fusion welding seam of HDPE liner in pond B**

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**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Extrusion welding repair made to HDPE liner in pond B**



**Vacuum box testing extrusion weld on cap of anchor trench in pond B**

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**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Cap over anchor trench # 3 in pond B**



**HDPE liner placed in sump in pond B**

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**CQA DAILY SUMMARY REPORT**

**Hawes Composting Facility**



**Geotextile and pipe placed in sump in pond B**



**Rock placed in sump in pond B**

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Geotextile placed on top of rock in sump in pond B**



**GCL placed on top of geotextile in sump in pond B**

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

---

**Hawes Composting Facility**



**HDPE liner placed on top of GCL in sump in pond B**



**Ripping subgrade material on the West side of compost area**

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Moisture conditioning subgrade material on the West side of compost area**

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**

Location:	San Bernardino County	Owner:	Nursery Products
CM:	Nursery Products	General:	Quantum
Engineer:	Geosyntec Consultants	Installer:	EC Applications Inc
Inspection CQA:	Zero Energy Institute	Prepared by:	James Hansen
Submitted to:	Nursery Products		

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**Report No.** 19

**Report Date** Tuesday March 13 2012

**Onsite:** 7:00am to 11:30pm

**Weather:** AM: Clear, Cold, and low Winds

PM: warm and breeze at 70 degree

**CQA Personnel:** ZEI CQA Personnel: James Hansen

**Hawes Composting Facility: Work Performed:**

- On-site at 7:00 am, cold and breeze at 47 degrees.
- Quantum continued removing material from surface impoundment pond A. Water trucks are moisture conditioning soil that is going to be used for engineered fill on the East side of composting area where fill is needed. Two 623 scrapers are placing material on the east side and compacting material by wheel rolling to 90% compacting. Between compacted lifts blade is scarifying and wind rolling dry material to be moisture conditioned.
- Quantum began back filling anchor trench around pond B.
- EC Applications INC. began repairing and vacuum box testing repairs made to HDPE liner.
- Off-site at 11:30 pm.

**Personnel:**

Quantum: (2)-laborers, (1) Superintendent, (5) Operator

EC Applications Inc: (1) Superintendent, (2) laborer, (2) operators

ZEI CQA: James Hansen

Equipment: (1) John Deere Blade, (2) 623 Scrapers, (2) Water Trucks, (1) Smooth drum roller, (1) Back-hoe, (1) Fork Lift, (1) Bobcat

**Meetings, Action Items and Resolutions:**

- None.

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

**Hawes Composting Facility**

**Action Item:**  **Action Correction Item:** **Attachments:** Photo's



**Extrusion welding repair made to HDPE liner in pond B**



**Vacuum box testing extrusion weld on repair in pond B**

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**623 scrapper removing material from pond A**



**Blade back filling anchor trench around pond B**

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**

Location:	San Bernardino County	Owner:	Nursery Products
CM:	Nursery Products	General:	Quantum
Engineer:	Geosyntec Consultants	Installer:	EC Applications Inc
Inspection CQA:	Zero Energy Institute	Prepared by:	James Hansen
Submitted to:	Nursery Products		

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**Report No.** 20

**Report Date** **Wednesday** March 21 2012

**Onsite:** 8:00am to 1:00pm

**Weather:** AM: Clear, Cold, and low Winds

PM: warm and breeze at 77 degree

**CQA Personnel:** ZEI CQA Personnel: James Hansen

**Hawes Composting Facility: Work Performed:**

- On-site at 8:00 am, cold and breeze at 56 degrees.
- Quantum continued removing material from surface impoundment pond A. Water trucks are moisture conditioning soil that is going to be used for engineered fill on the West side of composting area where fill is needed. Two 623 scrapers are placing material on the east side and compacting material by wheel rolling to 90% compacting. Between compacted lifts blade is scarifying and wind rolling dry material to be moisture conditioned.
- Off-site at 1:00 pm.

**Personnel:**

Quantum: (2)-laborers, (1) Superintendent, (5) Operator

EC Applications Inc: (0) Superintendent, (0) laborer, (0) operators

ZEI CQA: James Hansen

Equipment: (1) John Deere Blade, (2) 623 Scrapers, (2) Water Trucks, (1) Smooth drum roller, (1) Back-hoe, (1) Fork Lift

**Meetings, Action Items and Resolutions:**

- None.

**Action Item:**  **Action Correction Item:** **Attachments:** Photo's

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**623 scrapper placing fill material on the West side of compost area**



**Moisture condition material in pond A**

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**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Two 623 scrapers removing material from pond A**



**Subgrade of pond A**

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**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Pond B picture from the East side looking to the West side.**

# ZERO ENERGY INSTITUTE

## CQA DAILY SUMMARY REPORT

### Hawes Composting Facility

Location:	San Bernardino County	Owner:	Nursery Products
CM:	Nursery Products	General:	Quantum
Engineer:	Geosyntec Consultants	Installer:	EC Applications Inc
Inspection CQA:	Zero Energy Institute	Prepared by:	James Hansen
Submitted to:	Nursery Products		

**Report No.** 21

**Report Date** Monday April 02 2012

**Onsite:** 7:00am to 4:30pm

**Weather:** AM: Clear, Cold, and low Winds

PM: warm and breeze at 85 degree

**CQA Personnel:** ZEI CQA Personnel: James Hansen

#### **Hawes Composting Facility: Work Performed:**

- On-site at 7:00 am, cold and breeze at 62 degrees.
- Quantum continued removing soil overburden in the cut (center of waste pile) area and placing fill in the west fill area. Using two (2) scrapers Quantum excavated approximately 5,100 cubic yards. Area which received fill material was scarified to a minimum depth of 8 inches using the rippers on the grading equipment. Fill material watered, leveled and compacted in-place until firm and unyielding. No pumping or expansive material witnessed.
- Sladden Engineering on-site to test compliance on Moisture/Density for all fill placement and Pond A Lysimeter subgrade.
- EC Applications (ECA) on site to install Pond A Lysimeter sump. Area of Lysimeter previously excavated, shaped per plan and compacted subgrade using hand-wackier. Lysimeter area approved for lining. ECA places GCL in sump area to lines and grades per plan. Bentonite power used at butt-seams and all overlaps. GCL heat tacked together. 60 Mil HDPE liner placed directly above HDPE liner. ECA uses extrusion equipment to join panels. All pre-welds passed the min. specification. All welding monitored then tested non-destructively via. vacuum box method. Geotextile placed directly above the HDPE liner for protection, geotextile overlapped and heat tacked together. Sump collection gravel rock placed lightly on the Lysimeter section and consolidated with hand tamper. Lysimeter gravel wrapped in full.
- Off-site at 5:00 pm.

#### **Personnel:**

Quantum: (2)-laborers, (1) Superintendent, (5) Operator

EC Applications Inc: (0) Superintendent, (0) laborer, (0) operators

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**CQA DAILY SUMMARY REPORT**

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## **Hawes Composting Facility**

ZEI CQA: Brett Jordan

Equipment: (1) John Deere Blade, (2) 623 Scrappers, (2) Water Trucks, (1) Smooth drum roller, (1) Back-hoe, (1) Fork Lift

**Meetings, Action Items and Resolutions:**

- Lysimeter Pond A construction
- Sladden Engineering on-site to test fill soil

**Action Item:**  **Action Correction Item:** **Attachments:** Photo's



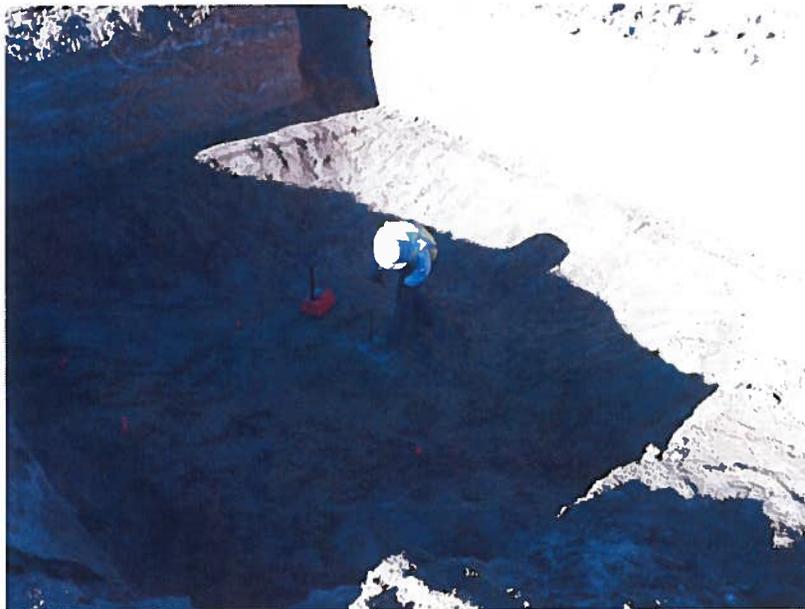
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**CQA DAILY SUMMARY REPORT**

**Hawes Composting Facility**

**Pond B rough grade**



**Pond A bottom Lysimeter Excavation**



**Lysimeter Excavation subgrade moisture/density test**

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**Hawes Composting Facility**



**GCL placed in Lysimeter subgrade Pond A**



**Geotextile cushion fabric placed above 60-mil HDPE Liner**

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**Hawes Composting Facility**



**Pre-Approved gravel for Lysimeter & Sump rock**



**Completed Lysimeter with gravel wrapped by geotextile**

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**Hawes Composting Facility**



**Backfill Pond A Lysimeter 1-foot lifts**

# ZERO ENERGY INSTITUTE

## CQA DAILY SUMMARY REPORT

### Hawes Composting Facility

Location:	San Bernardino County	Owner:	Nursery Products
CM:	Nursery Products	General:	Quantum
Engineer:	Geosyntec Consultants	Installer:	EC Applications Inc
Inspection CQA:	Zero Energy Institute	Prepared by:	James Hansen
Submitted to:	Nursery Products		

**Report No.** 22

**Report Date** Tuesday April 03 2012

**Onsite:** 7:00am to 4:30pm

**Weather:** AM: Clear, Cold, and low Winds

PM: warm and breeze at 88 degree

**CQA Personnel:** ZEI CQA Personnel: James Hansen

#### Hawes Composting Facility: Work Performed:

- On-site at 7:00 am, cold and breeze at 62 degrees.
- Quantum continued removing soil overburden in the cut (center of waste pile) area and placing fill in the west fill area. Using two (2) scrapers Quantum excavated approximately 5,200 cubic yards. Area which received fill material was scarified to a minimum depth of 8 inches using the rippers on the grading equipment. Fill material watered, leveled and compacted in-place until firm and unyielding. No pumping or expansive material witnessed.
- Nursery Products working on access road.
- Quantum completed backfill operation Pond A Lysimeter to rough subgrade elevation. Lifts placed in approximately 1-foot deep, watered and compacted with smooth drum roller. Fill material firm and unyielding, no pumping or expansive soil witnessed.
- Off-site at 5:00 pm.

#### Personnel:

Quantum: (2)-laborers, (1) Superintendent, (5) Operator

EC Applications Inc: (0) Superintendent, (0) laborer, (0) operators

ZEI CQA: Brett Jordan

Equipment: (1) John Deere Blade, (2) 623 Scrapers, (2) Water Trucks, (1) Smooth drum roller, (1) Back-hoe, (1) Fork Lift

#### Meetings, Action Items and Resolutions:

**Action Item:**  **Action Correction Item:** **Attachments:** Photo's

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**CQA DAILY SUMMARY REPORT**

**Hawes Composting Facility**



**Easterly Fill Limits (looking South)**

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**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Equipment working in Easterly Fill**



**Cat 623 Scrapper in center waste-pile cut area**

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**Hawes Composting Facility**



**Pond A Anchor Trench excavation**



**Water Truck in Fill Area**

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**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**

Location:	San Bernardino County	Owner:	Nursery Products
CM:	Nursery Products	General:	Quantum
Engineer:	Geosyntec Consultants	Installer:	EC Applications Inc
Inspection CQA:	Zero Energy Institute	Prepared by:	James Hansen
Submitted to:	Nursery Products		

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**Report No.** 23

**Report Date** **Monday April 09 2012**

**Onsite:** 6:30am to 4:30pm

**Weather:** AM: Clear, Cold, and Some light Winds

PM: warm and breeze at 80 degree

**CQA Personnel:** ZEI CQA Personnel: James Hansen

**Hawes Composting Facility: Work Performed:**

- On-site at 6:30 am, cold and breeze at high 50's degrees.
- Quantum continued removing soil overburden in the cut (center of waste pile) area and placing fill in the west fill area. Using two (2) scrapers Quantum excavated approximately 5,000 cubic yards. Area which received fill material was scarified to a minimum depth of 8 inches using the rippers on the grading equipment. Fill material watered, leveled and compacted in-place until firm and unyielding. No pumping or expansive material witnessed.
- Quantum starts to fine grade Pond A subgrade. Using a grader Quantum grades the subgrade level and smooth, water added to moisture condition the soil and assist in compaction. Quantum grade checker on-site to set and control finish grade. Smooth drum roller compacts surface of Pond A subgrade.
- Quantum starts to rip and re-compact Pond A side-slopes. Material ripped to about 8-inches, watered and shaped with the dozer. Using a smooth drum roller Quantum compacts side-slopes to a firm and unyielding condition.
- Off-site at 4:30 pm.

**Personnel:**

Quantum: (2)-laborers, (1) Superintendent, (5) Operator

EC Applications Inc: (0) Superintendent, (0) laborer, (0) operators

ZEI CQA: Brett Jordan

Equipment: (1) John Deere Blade, (2) 623 Scrapers, (2) Water Trucks, (1) Smooth drum roller, (1) Back-hoe, (1) Fork Lift

**Meetings, Action Items and Resolutions:**

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**CQA DAILY SUMMARY REPORT**

**Hawes Composting Facility**

**Action Item:**  **Action Correction Item:** **Attachments:** Photo's



**Grader Fine Grades Pond A subgrade**



**Scraper hauls fill soil to Pond A**

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**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**



**Pond A South-Slope Scarified and watered**



**Pond A side-slope grading**

# ZERO ENERGY INSTITUTE

## CQA DAILY SUMMARY REPORT

### Hawes Composting Facility

Location:	San Bernardino County	Owner:	Nursery Products
CM:	Nursery Products	General:	Quantum
Engineer:	Geosyntec Consultants	Installer:	EC Applications Inc
Inspection CQA:	Zero Energy Institute	Prepared by:	James Hansen
Submitted to:	Nursery Products		

**Report No.** 24

**Report Date** Tuesday April 10 2012

**Onsite:** 6:30am to 4:30pm

**Weather:** AM: Clear, Cold, and Some Strong Winds PM: warm, high winds at 70 degree

**CQA Personnel:** ZEI CQA Personnel: James Hansen

#### **Hawes Composting Facility: Work Performed:**

- On-site at 6:30 am, cold and breeze at high 50's degrees.
- Quantum continued removing soil overburden in the cut (center of waste pile) area and placing fill in the west fill area. Using two (2) scrapers Quantum excavated approximately 5,000 cubic yards. Area which received fill material was scarified to a minimum depth of 8 inches using the rippers on the grading equipment. Fill material watered, leveled and compacted in-place until firm and unyielding. No pumping or expansive material witnessed. Some scraper loads taken to Pond A for fill as-needed, material suitable for fill in ponds.
- Quantum continues to fine grade Pond A subgrade. Using a grader and small dozer Quantum grades the subgrade and side-slopes level and smooth, water added to moisture condition the soil and assist in compaction. Quantum grade checker on-site to set and control finish grade. Smooth drum roller compacts surface of Pond A subgrade.
- Quantum continues to rip and re-compact Pond A side-slopes. Material ripped to about 8-inches, watered and shaped with the dozer. Using a smooth drum roller Quantum compacts side-slopes to a firm and unyielding condition.
- Off-site at 4:30 pm.

#### **Personnel:**

Quantum: (2)-laborers, (1) Superintendent, (5) Operator

EC Applications Inc: (0) Superintendent, (0) laborer, (0) operators

ZEI CQA: Brett Jordan

Equipment: (1) John Deere Blade, (2) 623 Scrapers, (2) Water Trucks, (1) Smooth drum roller, (1) Back-hoe, (1) Fork Lift

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**CQA DAILY SUMMARY REPORT**

**Hawes Composting Facility**

**Meetings, Action Items and Resolutions:**

**Action Item:**  **Action Correction Item:** **Attachments:** **Photo's**



**Pond A Northerly Anchor Trench**



**Pond A ripping and scarifying subgrade**

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**Hawes Composting Facility**



**Pond A Scarified and watered**



**Pond A Elevation Grade Check**

# ZERO ENERGY INSTITUTE

## CQA DAILY SUMMARY REPORT

### Hawes Composting Facility

Location:	San Bernardino County	Owner:	Nursery Products
CM:	Nursery Products	General:	Quantum
Engineer:	Geosyntec Consultants	Installer:	EC Applications Inc
Inspection CQA:	Zero Energy Institute	Prepared by:	James Hansen
Submitted to:	Nursery Products		

**Report No.** 25

**Report Date** Thursday April 12 2012

**Onsite:** 6:30am to 4:30pm

**Weather:** AM: Clear, Cold, and Some Strong Winds PM: warm, high winds at 70 degree

**CQA Personnel:** ZEI CQA Personnel: James Hansen

#### **Hawes Composting Facility: Work Performed:**

- On-site at 6:30 am, cold and breeze at high 50's degrees.
- Quantum continued removing soil overburden in the cut (center of waste pile) area and placing fill in the west fill area. Using two (2) scrapers Quantum excavated approximately 5,200 cubic yards. Area which received fill material was scarified to a minimum depth of 8 inches using the rippers on the grading equipment. Fill material watered, leveled and compacted in-place until firm and unyielding. No pumping or expansive material witnessed. Some scrapper loads taken to Pond A for fill as-needed, material suitable for fill in ponds.
- Quantum continues to fine grade Pond A subgrade and side-slopes. Using a grader and small dozer Quantum grades the subgrade and side-slopes level and smooth, water added to moisture condition the soil and assist in compaction. Quantum grade checker on-site to set and control finish grade. Smooth drum roller compacts surface of Pond A subgrade.
- Quantum continues to rip and re-compact Pond A side-slopes. Material ripped to about 8-inches, watered and shaped with the dozer. Using a smooth drum roller Quantum compacts side-slopes to a firm and unyielding condition.
- Off-site at 3:30 pm.

#### **Personnel:**

Quantum: (2)-laborers, (1) Superintendent, (5) Operator

EC Applications Inc: (0) Superintendent, (0) laborer, (0) operators

ZEI CQA: Brett Jordan

Equipment: (1) John Deere Blade, (2) 623 Scrapers, (2) Water Trucks, (1) Smooth drum roller, (1) Back-hoe, (1) Fork Lift

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**CQA DAILY SUMMARY REPORT**

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## **Hawes Composting Facility**

**Meetings, Action Items and Resolutions:**

**Action Item:**  **Action Correction Item:** **Attachments:** Photo's



**Pond A Subgrade Preparation**

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**CQA DAILY SUMMARY REPORT**

**Hawes Composting Facility**



**Pond A ripping and scarifying subgrade**



**Pond A Scarified and watered**

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**Hawes Composting Facility**



**Pond A Elevation Grade Check**

# ZERO ENERGY INSTITUTE

## CQA DAILY SUMMARY REPORT

### Hawes Composting Facility

Location:	San Bernardino County	Owner:	Nursery Products
CM:	Nursery Products	General:	Quantum
Engineer:	Geosyntec Consultants	Installer:	EC Applications Inc
Inspection CQA:	Zero Energy Institute	Prepared by:	James Hansen
Submitted to:	Nursery Products		

**Report No.** 26

**Report Date** Friday April 13 2012

**Onsite:** 7:00am to 12:30pm

**Weather:** AM: Clear, cold, and some winds

PM: warm, high winds at 70 degree

**CQA Personnel:** ZEI CQA Personnel: Brett Jordan

#### **Hawes Composting Facility: Work Performed:**

- On-site at 7:00 am, cold and breeze at high 50's degrees.
- Quantum continued removing soil overburden in the cut (center of waste pile) area and placing fill in the west fill area. Using two (2) scrapers Quantum excavated approximately 5,400 cubic yards. Area which received fill material was scarified to a minimum depth of 8 inches using the rippers on the grading equipment. Fill material watered, leveled and compacted in-place until firm and unyielding. No pumping or expansive material witnessed. Some scrapper loads taken to Pond A for fill as-needed, material suitable for fill in ponds.
- Quantum continues to fine grade Pond A subgrade and side-slopes. Using a grader and small dozer Quantum grades the subgrade and side-slopes level and smooth, water added to moisture condition the soil and assist in compaction. Quantum grade checker on-site to set and control finish grade.
- Smooth drum roller compacts surface of Pond A subgrade.
- Quantum preparing perimeter anchor trench Pond A for lining installation scheduled for early next week.
- Quantum starts to shape and excavate the Pond A low-point leak detection sump per plan.
- Off-site at 3:30 pm.

#### **Personnel:**

Quantum: (2)-laborers, (1) Superintendent, (5) Operator

EC Applications Inc: (0) Superintendent, (0) laborer, (0) operators

ZEI CQA: Brett Jordan

Equipment: (1) John Deere Blade, (2) 623 Scrapers, (2) Water Trucks, (1) Smooth drum roller, (1) Back-hoe, (1) Fork Lift

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**CQA DAILY SUMMARY REPORT**

**Hawes Composting Facility**

**Meetings, Action Items and Resolutions:**

**Action Item:**  **Action Correction Item:** **Attachments:** **Photo's**



**Pond A Subgrade Preparation**



**Pond A Moisture/Density Test Side-slopes**

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**Hawes Composting Facility**



**Pond A Smooth Drum Rolled Surface**



**Pond A Racked Smooth**

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**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**

Location:	San Bernardino County	Owner:	Nursery Products
CM:	Nursery Products	General:	Quantum
Engineer:	Geosyntec Consultants	Installer:	EC Applications Inc
Inspection CQA:	Zero Energy Institute	Prepared by:	James Hansen
Submitted to:	Nursery Products		

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**Report No.** 27

**Report Date** Monday April 16 2012

**Onsite:** 10:00am to 3:30pm

**Weather:** AM: Clear, cold, and some winds

PM: warm, high winds at 78 degree

**CQA Personnel:** ZEI CQA Personnel: Brett Jordan

**Hawes Composting Facility: Work Performed:**

- On-site at 7:00 am, cold and breeze at high 50's degrees.
- Quantum continues to fine grade Pond A subgrade and side-slopes in preparation for liner installation. Using a grader and small dozer Quantum grades the subgrade and side-slopes level and smooth, water added to moisture condition the soil and final smooth drum rolling was performed. Subgrade is good condition for lining.
- Quantum continues to cut and preparing perimeter anchor trench Pond A for lining installation.
- Quantum continues to shape and excavate the Pond A low-point leak detection sump per plan. Bottom edges rolled smooth into collection sump area. Quantum digs sump collection trench up slope to termination end point. Area watered lightly to avoid drying out.
- Quantum starts digging Pond A floor anchor trenches (4) in total. Anchor Ballast trench constructed per plan.
- Off-site at 3:30 pm.

**Personnel:**

Quantum: (2)-laborers, (1) Superintendent, (5) Operator

EC Applications Inc: (0) Superintendent, (0) laborer, (0) operators

ZEI CQA: Brett Jordan

Equipment: (1) John Deere Blade, (2) 623 Scrappers, (2) Water Trucks, (1) Smooth drum roller, (1) Back-hoe, (1) Fork Lift

**Meetings, Action Items and Resolutions:**

**Action Item:**  **Action Correction Item:** **Attachments:** Photo's

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**CQA DAILY SUMMARY REPORT**

**Hawes Composting Facility**



**Pond A Subgrade & Leak Detection Sump up Slope**



**Floor Ballast Anchor Trench**

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**Hawes Composting Facility**



**Pond A Floor Ballast Trench Compacted Bottom**



**Pond A Ballast System per plan**

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**Hawes Composting Facility**



**Leak Detention Collection Trench Pond A**



**Most Westerly Ballast Trench Pond A**

# ZERO ENERGY INSTITUTE

## CQA DAILY SUMMARY REPORT

### Hawes Composting Facility

Location:	San Bernardino County	Owner:	Nursery Products
CM:	Nursery Products	General:	Quantum
Engineer:	Geosyntec Consultants	Installer:	EC Applications Inc
Inspection CQA:	Zero Energy Institute	Prepared by:	James Hansen
Submitted to:	Nursery Products		

**Report No.** 28

**Report Date** Tuesday April 17 2012

**Onsite:** 6:30 am to 4:30pm

**Weather:** AM: Clear, cold, and some winds

PM: warm, high winds at 78 degree

**CQA Personnel:** ZEI CQA Personnel: Brett Jordan

#### **Hawes Composting Facility: Work Performed:**

- On-site at 7:00 am, cold and breeze at high 50's degrees.
- Quantum continues to cut and preparing perimeter anchor trench Pond A for HDPE lining installation.
- ECA arrives on-site and started placing approved GCL in floor ballast anchor trenches. GCL placed directly above prepared trench subgrade, all GCL overlaps placed with bentonite powder sealant. GCL panels marked by ECA and inspected by ZEI CQA personnel. The GCL was covered immediately by the approved 60-mil HDPE liner. ECA prepared start up trial weld using the extrusion gun, all samples passed project requirements. HDPE panel joined and tested via. vacuum box test, result passed.
- Geotextile cushion fabric was then placed directly above the ballast HDPE to protect the liner from the soil ballast material. Ballast trench approved for backfill.
- Quantum starts placing ballast fill material above liner section. Care was used to place in shallow lift and protect the liner system. No damages observed during fill placement.
- ECA starts to place GCL on the approved subgrade west slope, ramp area lined to first ballast trench.
- Off-site at 3:30 pm.

#### **Personnel:**

Quantum: (2)-laborers, (1) Superintendent, (5) Operator. ECA -10 guys

EC Applications Inc: (0) Superintendent, (0) laborer, (0) operators

ZEI CQA: Brett Jordan

Equipment: (1) John Deere Blade, (2) 623 Scrappers, (2) Water Trucks, (1) Smooth drum roller, (1) Back-hoe, (1) Fork Lift

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**CQA DAILY SUMMARY REPORT**

**Hawes Composting Facility**

**Meetings, Action Items and Resolutions:**

**Action Item:**  **Action Correction Item:** **Attachments:** Photo's



**Pond A GCL deployed at Ballast Trench**



**Pond A Floor Ballast Anchor Trench GCL (looking south) most westerly trench**

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**CQA DAILY SUMMARY REPORT**

**Hawes Composting Facility**



**Pond A Floor Ballast Trench 60-mil HDPE Liner above GCL (no exposed GCL)**



**Pond A Ballast System Geotextile above the HDPE for cushion and protection**

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**Hawes Composting Facility**



**Ballast fill above liner system**



**Most Westerly Ballast Trench and Ramp area GCL Pond A**

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**CQA DAILY SUMMARY REPORT**

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**Hawes Composting Facility**

Location:	San Bernardino County	Owner:	Nursery Products
CM:	Nursery Products	General:	Quantum
Engineer:	Geosyntec Consultants	Installer:	EC Applications Inc
Inspection CQA:	Zero Energy Institute	Prepared by:	James Hansen
Submitted to:	Nursery Products		

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**Report No.** 29

**Report Date** **Wednesday April 18 2012**

**Onsite:** 6:30 am to 4:30pm

**Weather:** AM: Clear, cold, and some winds

PM: warm, high winds at 78 degree

**CQA Personnel:** ZEI CQA Personnel: Brett Jordan

**Hawes Composting Facility: Work Performed:**

- On-site at 7:00 am, cold and breeze at high 50's degrees.
- Quantum continues to cut high spot locations center of the waste fill area. Using two scrapers, two water truck, and the grader, Quantum continued to cut and fill waste pile
- ECA continued to place GCL and HDPE liner. ECA places leak detection collection sump GCL, HDPE, geotextile and piping.
- Before welding, ECA performed pre-weld trials to ensure compliance. All trial weld passed project specifications.
- ECA shapes end point of the ballast trenches making relief cuts in corners and extrusion welding per industry standard. ECA completes ballast trench #2 then continues to place HDPE above GCL.
- Quantum continues to placing ballast fill material above liner section. Care was used to place in shallow lift and protect the liner system. No damages observed during fill placement.
- ECA completed in-house quality control (QC) performing air test on fusion wedge welds and vacuum box tests on fusion welds. All QC results placed directly on liner and witnessed by the on-site CQA.
- Off-site at 3:30 pm.

**Personnel:**

Quantum: (2)-laborers, (1) Superintendent, (5) Operator. ECA -10 guys

EC Applications Inc: (0) Superintendent, (0) laborer, (0) operators

ZEI CQA: Brett Jordan

Equipment: (1) John Deere Blade, (2) 623 Scrapers, (2) Water Trucks, (1) Smooth drum roller, (1) Back-hoe, (1) Fork Lift

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

**Hawes Composting Facility**

**Meetings, Action Items and Resolutions:**

**Action Item:**  **Action Correction Item:** **Attachments:** Photo's



**Pond A GCL deployed north slope**



**Pond A Leak Detection Sump**

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**CQA DAILY SUMMARY REPORT**

**Hawes Composting Facility**



**Pond A Floor leak detection sump and riser pipe**



**Pond A leak detection sump system**

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**CQA DAILY SUMMARY REPORT**

**Hawes Composting Facility**



**Pond A Extrusion Weld Cap on Ballast Trench to Close System**



**Pond A ballast system closure**

# ZERO ENERGY INSTITUTE

## CQA DAILY SUMMARY REPORT

### Hawes Composting Facility

Location:	San Bernardino County	Owner:	Nursery Products
CM:	Nursery Products	General:	Quantum
Engineer:	Geosyntec Consultants	Installer:	EC Applications Inc
Inspection CQA:	Zero Energy Institute	Prepared by:	Shannon Goodrich
Submitted to:	Nursery Products		

**Report No.** 30

**Report Date** Thursday April 19 2012

**Onsite:** 6:30 am to 11:00 am

**Weather:** AM: Clear, cold, and some winds

PM: warm, high winds at 78 degree

**CQA Personnel:** ZEI CQA Personnel: Brett Jordan

#### Hawes Composting Facility: Work Performed:

- On-site at 6:30 am, cold and breeze at low 60's degrees.
- Quantum continues to cut high spot locations center of the waste fill area. Using two scrapers, two water truck, and the grader, Quantum continued to cut and fill waste pile, fill being placed on the westerly fill area.
- ECA continued to place GCL and HDPE liner. Before welding, ECA performed pre-weld trials to ensure compliance. All trial weld passed project specifications.
- ECA continue to perform quality control (QC) on all field seams. Vacuum box test conducted on the extrusion welds and air test performed on all fusion welds. All QC results documented on the liner surface to ensure compliance.
- Quantum continues to placing ballast fill material above liner section. Care was used to place in shallow lift and protect the liner system. No damages observed during fill placement.
- ECA completed in-house quality control (QC) performing air test on fusion wedge welds and vacuum box tests on fusion welds. All QC results placed directly on liner and witnessed by the on-site CQA.
- Quantum and ECA left site due to fatal accident, an ECA laborer hit by a bobcat.
- Off-site at 11:00 pm.

#### **Personnel:**

Quantum: (2)-laborers, (1) Superintendent, (5) Operator. ECA -10 guys

EC Applications Inc: (0) Superintendent, (0) laborer, (0) operators

ZEI CQA: Brett Jordan

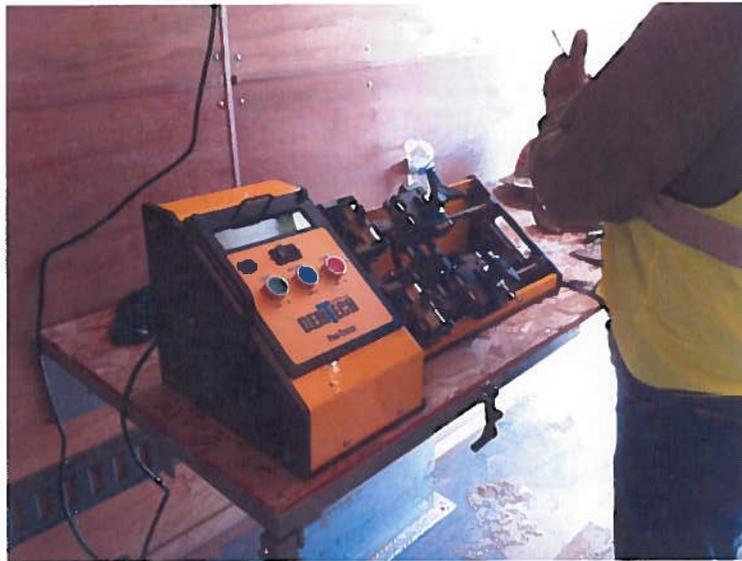
Equipment: (1) John Deere Blade, (2) 623 Scrapers, (2) Water Trucks, (1) Smooth drum roller, (1) Back-hoe, (1) Fork Lift

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

**Hawes Composting Facility**

**Meetings, Action Items and Resolutions:**

**Action Item:**  **Action Correction Item:** **Attachments:** Photo's



**ECA trial weld before production seaming**



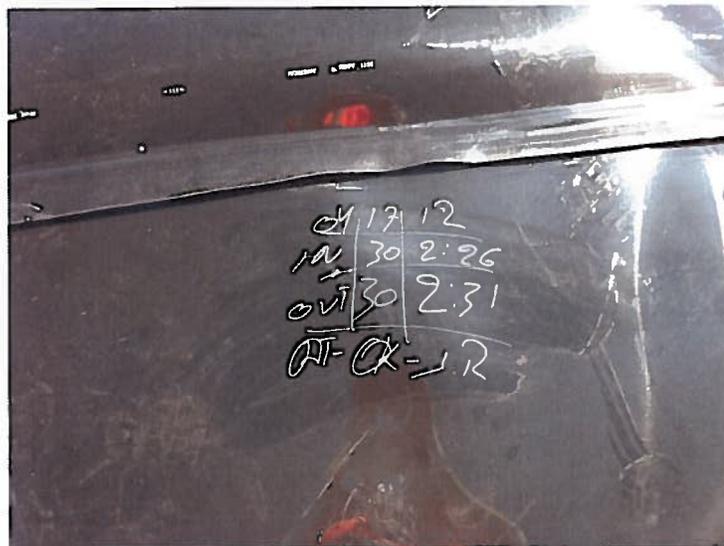
**Pond A Quality Control Vacuum Box Testing**

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

**Hawes Composting Facility**



**Pond A HDPE Installation**



**Pond A Quality Control (QC) test documentation Air-Test**

# ZERO ENERGY INSTITUTE

## CQA DAILY SUMMARY REPORT

### Hawes Composting Facility

Location:	San Bernardino County	Owner:	Nursery Products
CM:	Nursery Products	General:	Quantum
Engineer:	Geosyntec Consultants	Installer:	EC Applications Inc
Inspection CQA:	Zero Energy Institute	Prepared by:	Shannon Goodrich
Submitted to:	Nursery Products		

**Report No.** 31

**Report Date** Monday April 23 2012

**Onsite:** 11:00 am to 4:00 am

**Weather:** AM: Clear, cold, and some winds

PM: warm, high winds at 78 degree

**CQA Personnel:** ZEI CQA Personnel: Brett Jordan

#### **Hawes Composting Facility: Work Performed:**

- Called By Chris Seney of Nursery Products and notified that liner was being installed by ECA.
- On-site at 11:00 am, warm and breeze at low 70's degrees.
- Quantum continues to cut/fill operations of the waste fill area. Using two scrapers, two water trucks, and the grader, Quantum continued to cut and fill waste pile, fill being placed on the westerly fill area.
- ECA continued to place GCL and HDPE liner. Before welding, ECA performed pre-weld trials to ensure compliance. All trial weld passed project specifications.
- ECA continue to perform quality control (QC) on all field seams. Vacuum box test conducted on the extrusion welds and air test performed on all fusion welds. All QC results documented on the liner surface to ensure compliance.
- Quantum completed the placement of ballast fill material above liner section. Care was used to place in shallow lift and protect the liner system. No damages observed during fill placement. All ballast system and leak detention sump construction completed.
- ECA completed in-house quality control (QC) performing air test on fusion wedge welds and vacuum box tests on fusion welds. All QC results placed directly on liner and witnessed by the on-site CQA.
- Off-site at 4:00 pm.

#### **Personnel:**

Quantum: (2)-laborers, (1) Superintendent, (5) Operator. ECA -10 guys

EC Applications Inc: (0) Superintendent, (0) laborer, (0) operators

ZEI CQA: Brett Jordan

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

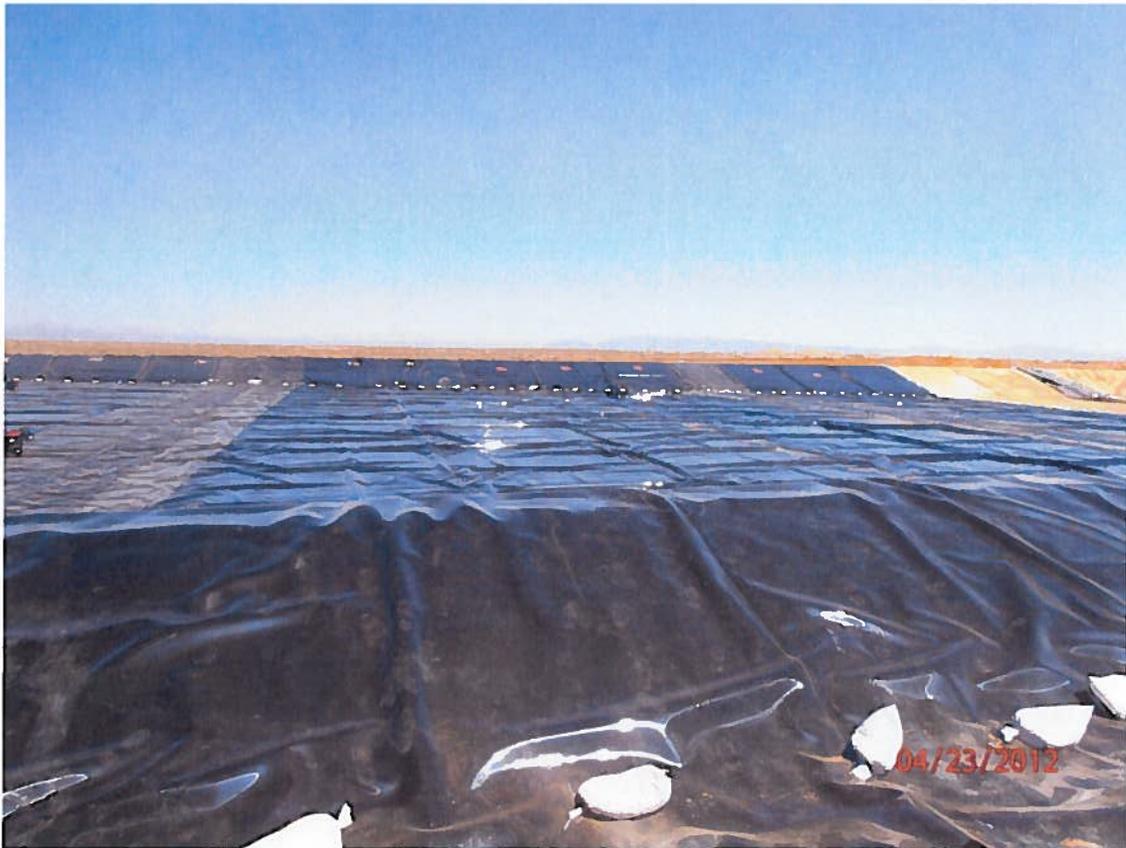
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## Hawes Composting Facility

Equipment: (1) John Deere Blade, (2) 623 Scrappers, (2) Water Trucks, (1) Smooth drum roller, (1) Back-hoe, (1) Fork Lift

**Meetings, Action Items and Resolutions:**

**Action Item:**  **Action Correction Item:** **Attachments:** Photo's



**Pond A 60 Mil HDPE anchor trench (looking North)**

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

**Hawes Composting Facility**



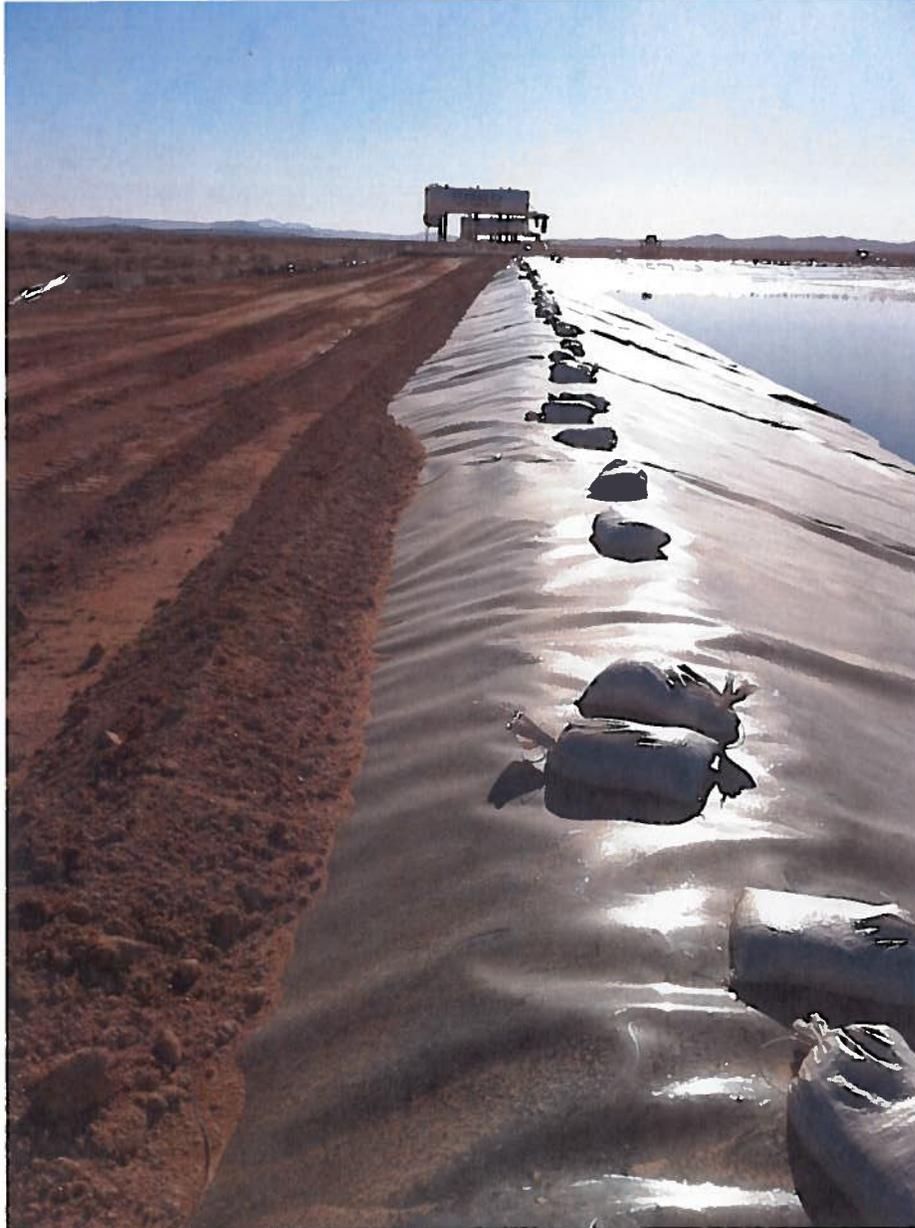
**Pond A Quality Control Destructive Seam Sampling**



**Pond A HDPE Morning Trail "Pre-Weld" Samples**

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

**Hawes Composting Facility**



**Pond A HDPE Liner Anchor Trench fill and compaction**

# ZERO ENERGY INSTITUTE

## CQA DAILY SUMMARY REPORT

### Hawes Composting Facility

Location:	San Bernardino County	Owner:	Nursery Products
CM:	Nursery Products	General:	Quantum
Engineer:	Geosyntec Consultants	Installer:	EC Applications Inc
Inspection CQA:	Zero Energy Institute	Prepared by:	Shannon Goodrich
Submitted to:	Nursery Products		

**Report No.** 32

**Report Date** Tuesday April 24 2012

**Onsite:** 6:30 am to 10:00 am

**Weather:** AM: Clear, cold, and some winds

PM: warm, high winds at 80 degree

**CQA Personnel:** ZEI CQA Personnel: Brett Jordan

#### **Hawes Composting Facility: Work Performed:**

- On-site at 6:30 am, warm and breeze at low 60's degrees.
- Quantum continues to cut/fill operations of the waste fill area. Using two scrapers, two water trucks, and the grader, Quantum continued to cut and fill waste pile, fill being placed on the westerly fill area. Quantum relocates fill operation to the most easterly fill area. Lift placed in shallow lifts about 6-inch, watered, leveled and compacted.
- ECA continued to place GCL and HDPE liner. Before welding, ECA performed pre-weld trials to ensure compliance. All trial weld passed project specifications.
- ECA and ZEI locate destructive seam sample locations. Samples taken from the in-place liner seams and tested for compliance in the field. All results passed seam strength requirements. Samples taken to the independent geomembrane laboratory for peel and shear testing.
- ECA continue to perform quality control (QC) on all field seams. Vacuum box test conducted on the extrusion welds and air test performed on all fusion welds. All QC results documented on the liner surface to ensure compliance. ECA completes all QC field seam and repair Pond A. ZEI and ECA perform final walk, in total (8) liner technicians and ZEI walk the entire liner surface and inspect the HDPE for imperfections. No imperfections observed. ECA clean up and demobilize form site.
- Off-site at 10:00 pm.

#### **Personnel:**

Quantum: (2)-laborers, (1) Superintendent, (5) Operator. ECA -10 guys  
EC Applications Inc: (1) Superintendent, (9) laborer, (0) operators

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

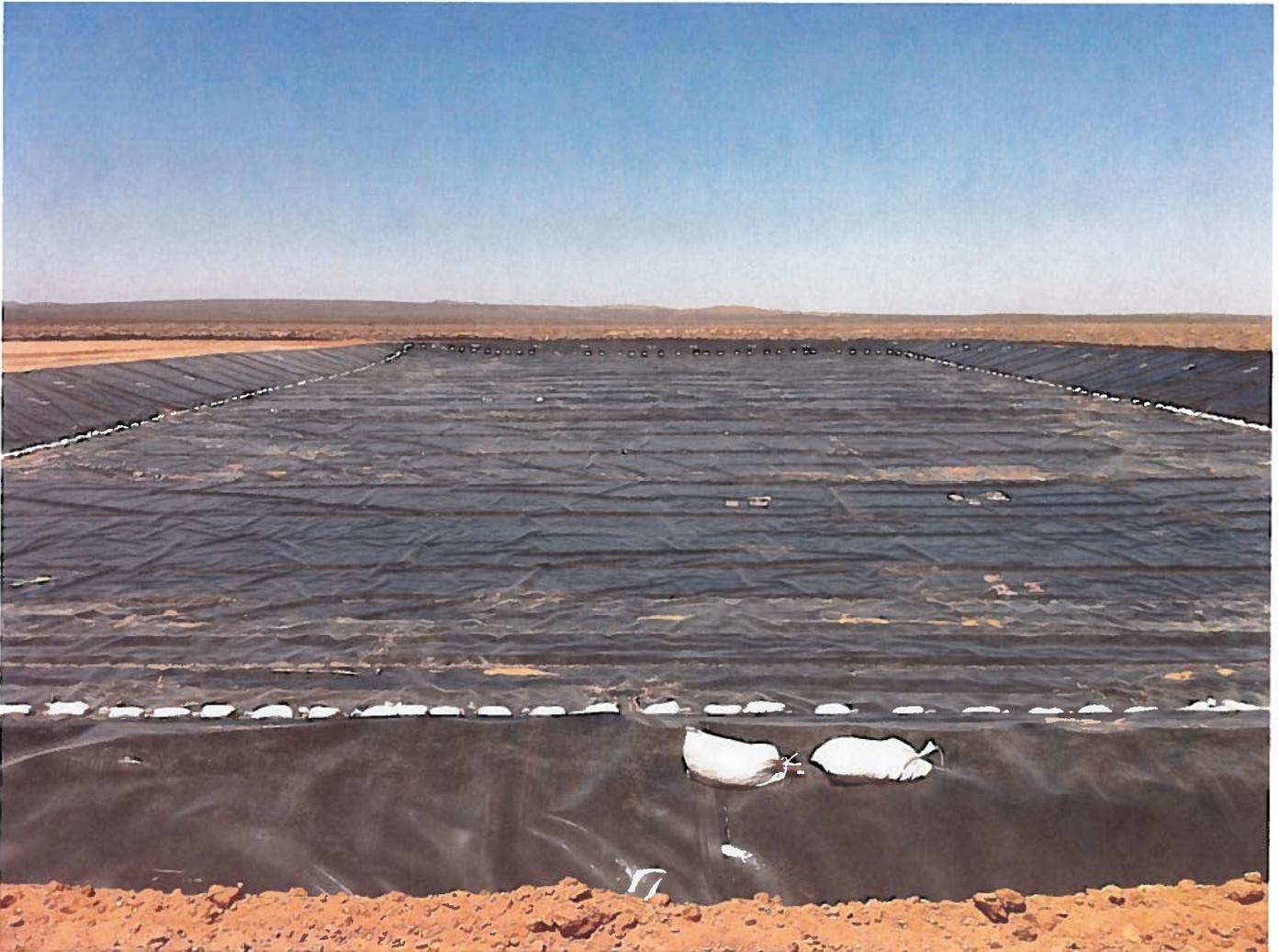
## Hawes Composting Facility

ZEI CQA: Brett Jordan

Equipment: (1) John Deere Blade, (2) 623 Scrappers, (2) Water Trucks, (1) Smooth drum roller, (1) Back-hoe, (1) Fork Lift

**Meetings, Action Items and Resolutions:**

**Action Item:**  **Action Correction Item:** **Attachments:** Photo's



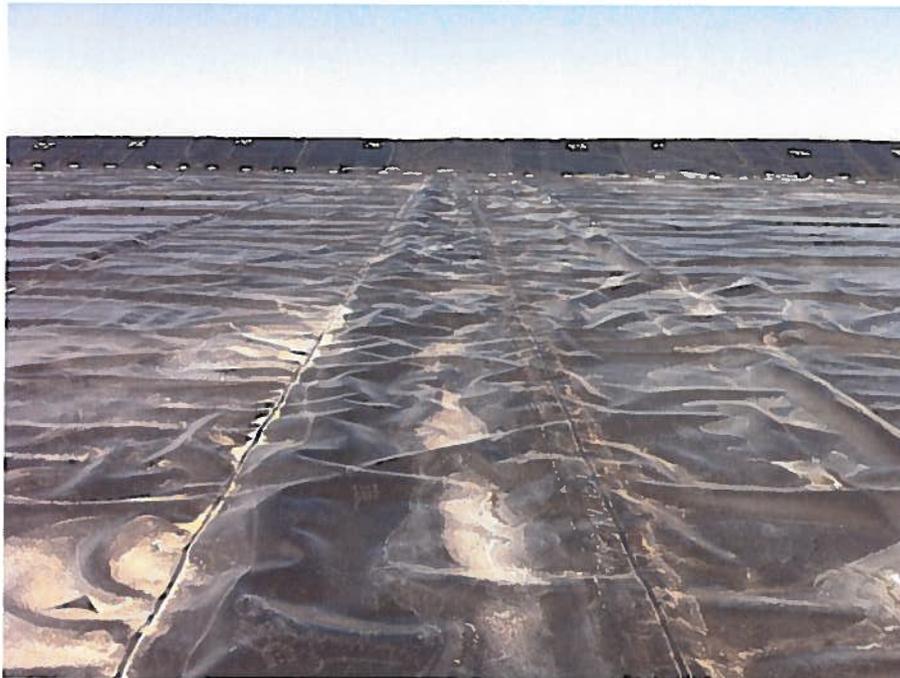
**Pond A 60 Mil HDPE Completed Installation (looking west)**

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

**Hawes Composting Facility**



**Pond A Quality Control Documentation Repair**



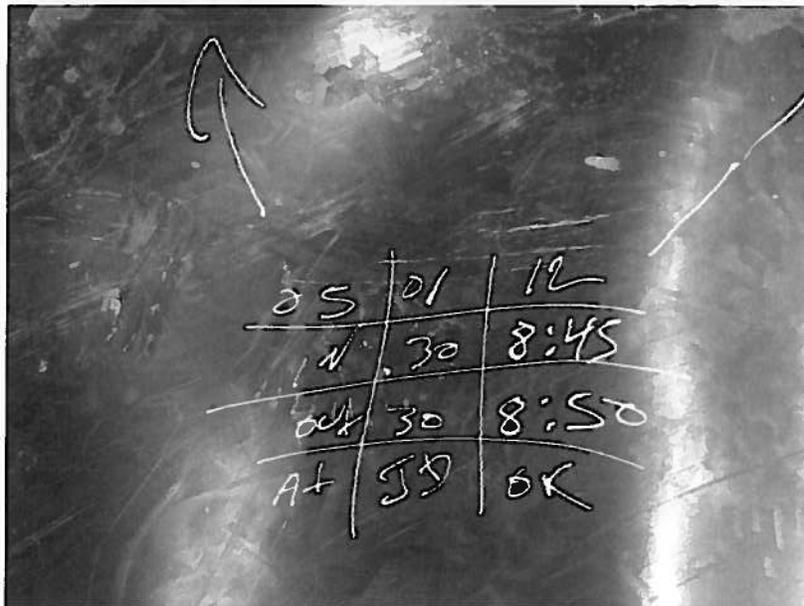
**Pond A HDPE Completed Liner Ballast System**

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

**Hawes Composting Facility**



**Pond A HDPE Liner Seam Destruct #2 Location and Repair**



**Pond A Quality Control Air Test Data**

**ZERO ENERGY INSTITUTE**  
**CQA DAILY SUMMARY REPORT**

**Hawes Composting Facility**



**Pond A Final Anchor Trench Backfill & Compaction**



**Pond A Completed (looking west)**

# Appendix G

ZEI Response to RWQCB Review Comments



July 30, 2012

Mr. Chris Seney  
Nursery Products, LLC  
PO Box 1439  
Helendale, CA 92342

**FINAL CONSTRUCTION QUALITY ASSURANCE REPORT, WASTE PILE COMPOSTING PAD AND SURFACE IMPOUNDMENTS A AND B, NURSERY PRODUCTS HAWES COMPOSTING FACILITY, SAN BERNARDINO COUNTY – *RESPONSE TO WATER BOARD COMMENTS DATED JULY 13, 2012.***

On July 16, 2012, Zero Energy Institute, LLC., received comments made by the Lahontan Regional Water Quality Control Board for the project referenced above. This correspondence addresses the Board's comments and provides clarification, appropriate documentation, and illustrations to support the technical responses. The RWQCB comments are in plain text and the ZEI's technical responses are in Bold-Italic font.

Water Board Comment:

As-Built Drawings

The hand-drawn as-built drawings provided in the Report do not demonstrate how the Facility was constructed but instead present only how the GCL and HDPE panels were installed in each surface impoundment. Section 2.1.8 of the Report indicates that detailed as-built drawings were performed for the surface impoundments; however, detailed drawings to indicate how the surface impoundments were constructed to include installation of the leak detection monitoring sumps and lysimeters were not provided. Section 3.2 indicates the leak detection and monitoring systems were constructed in accordance with the Geosyntec Consultant design. However, several iterations of the designs were submitted prior to final Water Board approval. Without detailed as-built drawings, Water Board staff is unable to determine if the leak detection and monitoring systems, in addition to the waste pile and surface impoundments, were constructed in accordance with the final Water Board approved design plan.



**ZEI RESPONSE:**

***The Leak Detection Monitoring Sumps (LDMS) and Lysimeters where constructed in accordance with the approved drawings, detail M (detail leak detection sump plan view) and detail N (detail lysimeter plan view) of the approved construction drawings, revision 2, sheet 8 of 9 respectfully. In section view, the Leak Detection Monitoring Sump and Lysimeter where constructed in accordance with Section H, Leak Detection Monitoring Sump and Lysimeter. The in-place liner system includes a Lysimeter (22'-0" feet long by 22'-0" feet wide) constructed five (5) feet below the lowest portion of each surface impoundment, at elevation 2,300. The Lysimeters are located directly below the LDMS and separated by a five (5'-0") foot vertical select soil fill. The Lysimeters consist of, from top to bottom including the trench line, a GCL, geomembrane, cushion geotextile fabric, 2-feet of clean washed gravel, and enveloped in a nonwoven geotextile wrap. A 6-inch diameter PVC pipe is installed within the gravel layer to allow access for liquid monitoring and or removal. The bottom 2-feet of the PVC monitoring pipe are perforated per plan.***



**Figure 1 - Lysimeter Bottom Soil QC Moisture/Density Test**



**Figure 2 - Completed Lysimeter Grading @ Elevation 2,300+/-.**



**Figure 3 - Lysimeter GCL Installation**



**Figure 4 - Completed Lysimeter GCL Installation**



**Figure 5 - Lysimeter HDPE Liner Installation**



**Figure 6- Lysimeter Geotextile Cushion Fabric and PVC Monitoring Pipe Placement**



**Figure 7 - Lysimeter Washed Gravel Placement**



**Figure 8 - Lysimeter Gravel Wrap with Geotextile Fabric**



**Figure 9 - Lysimeter Select Soil Backfill**



**The Surface Impoundment Lysimeters are constructed to allow for detection of the potential vertical migration of water and removal of a water sample for testing. The Lysimeter is constructed in accordance with the approved design plans.**

**The Surface Impoundment Leak Detection Monitoring Sumps (LDMS) are constructed below the lowest portion of each surface impoundment at or around elevation 2,305 respectfully, and located directly above the bottom Lysimeter (separated by 5-feet vertical). The LDMS are built per detail M, sheet 8 of 9 and Section view H, sheet 7 of 9. The LDMS allows for detection of the potential vertical migration of water through the primary HDPE liner system and removal of a water sample for testing. The LDMS is composed of, from top to bottom, a prepared subgrade, a GCL, a geomembrane, cushion Geotextile fabric, 2-feet of clean gravel, and a nonwoven filter Geotextile wrap. A 6-inch diameter PVC pipe is installed within the gravel layer to allow access for moisture detecting device and to allow for sampling and/or pumping of liquids from the LDMS. The LDMS was constructed as follows:**



**Figure 10 - Excavation of the LDMS Slope Trench to the Lines and Grades.**



**Figure 11 - Completed LDMS Subgrade**



**Figure 12 - LDMS GCL Installation**



**Figure 13 - LDMS HDPE Liner Installation**



**Figure 14 - LDMS Monitoring Pipe**



**Figure 15 - LDMS 2-feet of Washed Gravel Placement**



**Figure 16 - LDMS Gravel Placement above Detection Piping**



**Figure 17 - LDMS Gravel Wrapped In Nonwoven Geotextile Filter Fabric**



**Figure 18 - Final LDMS HDPE Liner Boot Penetration**



***The constructed LDMS was built in accordance with the approved Technical Specifications and approved construction drawings as illustrated in Section H, Section J, Section I, and Details L and M respectfully.***

***In response to the RWQCB comments, the liner installer, EC Applications has provided a revised "As-Built" drawing for the surface impoundments A and B. The drawings have been revised to include a computer generated drawing so that both impound A and B match in format. The revised drawings also include a Section of the LDMS and Lysimeter showing the vertical separation between the structures. The revised drawings are a substitute for the "hand-drawing" and should be included in ZEI's Appendix C- ECA CQC Documentation Surface Impoundments A and B.***

**Water Board Comment:**

Section 4.2.4.2 indicates that the edge of the liner is a minimum of 4 feet below ground surface. However, the approved design shows the leak detection monitoring sumps to be directly below the surface impoundment. Without detailed as built designs, Water Board staff are unable to determine if the leak detection sumps and lysimeters will function properly. Appendix C, *High-Density Polyethylene (HDPE) & Geosynthetic Clay Liner (GCL) Construction Quality Control (CQC) Documentation, Surface Impoundments A and B*, provides copies of hand-drawn field as-built drawings for panel placement of GCL and HDPE for surface impoundments A and B, with one computer-drafted drawing of HDPE installation for surface impoundment B. Appendix E, *East Waste Pile and Surface Impoundments As-Built Survey*, provides what appears to be surveyed elevations for the East Waste Pile, but the figure does not include the surveyed elevations for the surface impoundments, nor is the figure legible.

***Response:***

***Section 4.2.4.2 Liner Deployment (paragraph 2) of the ZEI report is detailing the floor ballast and perimeter anchor trench construction and does not relate to the bottom Lysimeter. However, the surface impoundment perimeter anchor trench system was constructed in accordance with the approved drawings Section C and E, sheet 6 of 9, respectfully. The perimeter anchor system is secured in-place with a minimum of 4-feet of compacted select fill above the liner.***



**Figure 19 - Surface Impoundment Perimeter Anchorage Sloped to 3:1**



**Figure 20 - Perimeter Anchorage System**



**Figure 21 - Final Backfill Perimeter Anchor Trench**

***The surface impoundment liner system is ballasted around the perimeter of the impoundments by a 2-foot minimum horizontal run and an additional 9-foot length of liner buried at a downward sloping inclination of 2:1 (horizontal: vertical) such that the leading edge is below the basin floor. The anchorage system was constructed per Detail C, sheet 6 of 9.***

Water Board Comment:

Appendix E, *East Waste Pile and Surface Impoundments As-Built Survey*, provides what appears to be surveyed elevations for the East Waste Pile, but the figure does not include the surveyed elevations for the surface impoundments, nor is the figure legible.

As submitted, this document does not adequately satisfy the requirements of sections V.B. or V.D. of the Board Order. You must demonstrate that the Facility was constructed in accordance with the final Water Board approved design plan and the Board Order. Please provide such a demonstration with detailed as-built design plans as well as a discussion for any deviations from the approved design plan.



**ZEI Response:**

***A revised “Final As-Built Survey” for the Waste Pile (East and West Portion) and surface impoundments is included for clarification and record drawings. The post grading survey was performed by a licensed surveyor from AEI-CASC Consulting. The survey was conducted at the completion of all work by the Owner, and includes all final in-place elevations, lines and grades for the entire constructed facility. The revised Nursery Products Hawes Composting Facility Post Grading Survey is a substitution for Appendix E. This revised as-built survey drawing is all inclusive and illustrates the entire Hawes Compost Facility including final grades, lines and elevations for the Waste Pile Composting Area and Surface Impoundments A and B.***

Water Board Comment:

**Facility Construction**

This Report only addressed the construction of the eastern portion of the Waste Pile and two surface impoundments. Construction specifications were not provided for the western portion of the Waste Pile. In addition, no explanation was given for why the entire facility (including the western portion of the Waste Pile) was not constructed in accordance with the Facility design plan. As the western portion of the Facility was not constructed, it also appears that the drainage structures along the Facility perimeter to the south and west were also not constructed as approved in the design plan. Without the drainage structures in place, the eastern portion of the constructed Facility is vulnerable to inundation from run-on to the Facility. Please provide an explanation as to why the entire Facility was not constructed in accordance with the final approved design plan; in addition, please provide a description of the measures or best management practices (BMPs) that will be installed to prevent inundation from run-on to the Facility until the drainage structures are installed per the approved final design plan.

**ZEI Response:**

***The original Construction Report only addressed the eastern portion of the Waste Pile and surface impoundments. At the time when the report was being prepared, the Owner elected to proceed without the full Waste Pile being completed and therefore, ZEI was directed to proceed with the certification of the Waste Pile eastern portion and surface impoundments***



***only. At the time, the grading Contractor was short on fill material to complete the west section composting area engineered fill. In time, the grading contractor completed the entire East and West Waste Pile Composting Area engineered fill, as permitted to the lines and grades illustrated on the approved grading plan, sheet 2 of 9. However, approximately 12 acres of the southerly section was not filled to final elevation due to lack of on-site borrow source material therefore; the owner revised the final grading plan to eliminate this section from the compost waste pile area. The area is separated by the HCF 1-foot high perimeter berm to control stormwater run-on and runoff. The surface in this area was graded at about 2% away from the waste pile and diversion berm and flows to the perimeter drainage channel, as illustrated on the post grading survey.***

***The project geotechnical engineer, Sladden Engineering, conducted soil conformance testing on the constructed Waste Pile earthworks to ensure compliance with the Technical Specifications. The Waste Pile Composting Area was constructed in accordance with the County of San Bernardino permit technical requirements and the approved plans and specifications.***

***The waste pile soil liner consists of a minimum 12-inch of engineered select fill which consist of native subgrade material scarified and moisture conditioned and compacted to 90 percent relative compaction as defined by ASTM D1557. The waste pile was first cleared of all native organics and bladed uniform followed by scarifying the in-place soils to a depth of 12 to 14-inches. Water was added as needed to control the moisture content of the processed soil. Compaction of the soil was achieved using a vibratory roller and heavy equipment until the fill was firm and unyielding. Moisture/Density testing was performed on the processed pad and fill at a frequency of one (1) test per 1,000 cubic yards of material processed, placed and compacted. Sladden Engineering provided the field sketch showing quality control test locations and supporting compaction results.***



**Figure 22 - Waste Pile Grading Operation Subgrade Preparation**



**Figure 23 - Waste Pile Subgrade Scarify, Watering and Compacting**



**Figure 24 - Waste Pile Soil Processing**



**Figure 25 - Waste Pile Grading and Moisture Conditioning**



**Figure 26 - Sladden Eng. Performs In-Place Moisture Density Tests West Portion Final Grade**

***Stormwater control consist of a drainage channel approximately 1,000 feet long at the southern end of the facility, designed and constructed to capture offsite stormwater run-on and redirect offsite flows around the HCF to the west and northwest. The drainage channel was constructed with 3:1 (horizontal/vertical) and a 25-wide channel bottom. The entire drainage channel is protected by a light armor lined ¼ ton rip-rap for erosion protection place approximately 3-feet thick.***



**Figure 27 - Perimeter Drainage Channel with Rip-Rap Armor- - Looking South**



**Figure 28 - Perimeter Drainage Channel with 1/4 ton Rip-Rap armor - Looking West**



***Appendix A – has been revised to include the entire, completed Waste Pile Composting Area. The revised Appendix includes Sladden Engineering CQA Earthworks testing for the completed Waste Pile Compost Area.***

***Appendix E – has been revised to include a Final Post Grading Survey. This survey shows all lines, grades and elevations of the constructed HCF.***

Water Board Comment:  
Quality Assurance

In Appendix B, *Geosynthetic Manufacturer's Quality Assurance GCL and HDPE Liner*, the quality reports from CETCO indicate the Manufacturing Quality Assurance Data Package is for the Dalton Trucking Yard project, not for the Hawes Composting Facility. Please clarify the apparent discrepancy.

***ZEI Response:***

***Dalton Trucking Yard is the location in which the CETCO GCL was delivered and stored at the Owners expense until the subgrade was approved. Dalton Trucking Yard is not a project but an "in-door" storage yard used by the Owner to protect the GCL.***



Water Board Comment:

Closing

You are reminded that the Final Construction Quality Assurance Report must be accepted by Water Board staff prior to discharge.

**ZEI Response:**

**Zero Energy Institute, LLC. respectfully submits these response comments to the RWQCB showing that it adequately satisfies the requirements of section V.B. or V.D. of the Board Order. Please do not hesitate to contact me at (760) 707-3574 ([sgoodrich@zeroenergyinstitute.com](mailto:sgoodrich@zeroenergyinstitute.com)) if you have any comments or require additional clarification.**

**Sincerely,**

A handwritten signature in blue ink that reads "Shannon M. Goodrich". The signature is written in a cursive style.

**Shannon M. Goodrich  
CQA Engineer  
Zero Energy Institute**

**Cc: Doug Hilts, P.E.**