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December 15, 2016

PaDEP – BWM
Attn: Mr. Roger Bellas
2 Public Square, 4th floor
Wilkes-Barre, PA 18711

RE: IESI – Bethlehem Landfill
Response to EAP Letter Dated 9/27/16
Our file: b/1162.3/2016/EAP/RL92716

Dear Mr. Bellas,

We are in receipt of your September 27, 2016 2nd EAP review letter and are providing responses as follows. We have included the DEP comments in conventional font, with our responses in **bold text.**

General Comments

The application should be revised to include more detailed information on the sequencing of the cap removal, gas system removal and construction within Cells SE1-A, SE1-B, SE2-A and SE2-B.

IESI response: The removal of capping in previously filled areas was approved as a minor modification on July 17, 2013 and will remain the same for this project. Per Form K, the sequencing for the installation of the gas system beneath the "piggyback" area is included.

DEP review: The Southeastern Realignment application should be a standalone document and should not reference details included in past applications. In addition, the July 17, 2013 permit modification is only for removal of cap in a ½ acre area. This proposal is for removal of 26 acres. IESI should provide detailed information as to the sequencing of cap removal, gas system removal and construction within Cells CE1-A, SE1-B, SE2-A, AND SE2-B.

Attached hereto (Attachment 1) is the Southeastern Realignment - Cap Removal & Waste Relocation Plan and Procedures document, which becomes an attachment to the Form 14 Operations Plan. This document evolved during the Lower Saucon Township (LST) Zoning and Land Development Approvals review process (Local Approval Process or LAP), and is included

S

ROUTING
- ☑ Council
- ☑ Manager
- ☐ Asst. Mgr.
- ☑ Zoning
- ☐ Finance
- ☐ Police
- ☐ P. Works
- ☐ P/C
- ☐ P & R
- ☐ EAC
- ☑ Engineer
- ☑ Solicitor
- ☐ Planner
- ☑ Landfill
- ☐ EMC
- ☐ Other

therewith as a part of the approved Land Development Permit. Additionally, LF-26 to LF-28 of the Landfill design plans, included here as Attachment 2, show the sequencing of areas where active filling will take place as the various phases of construction/operation evolve. Where there is existing cap within those areas, it will be removed per the Cap Removal Plan (Attachment 1). Per that Plan the ..."area will be limited to that which can be managed within a day or two."

Comments related to the Form D – Environmental Assessment

1. **Exclusionary Criteria – Wetlands:** The proposed expansion area is within 300' of an exceptional value wetland. The application includes a letter from Roemer Ecological Services, Inc. stating the wetlands are not of Exceptional Value (EV). IESI has also provided the jurisdictional determination relative to the wetlands from the Army Corps of Engineers which finds that there "may be" waters of the United States on the subject project site. DEP considers these wetlands as EV since the East Branch of Saucon Creek has wild trout as per Pennsylvania Fish & Boat Commission. Wetlands that are hydraulically connected to a stream that is a tributary to a stream that supports wild trout are considered Exceptional Value.

   The exclusionary criteria for wetlands do not apply to areas that were previously permitted, per 25 PA Code 273.202(b).

2. **Form D, Section B - Scenic Rivers:**

   Questions 11 and 12: The application does not take into consideration the volume control or water quality treatment requirements of Chapter 102. A volume control requirement is essential to mitigate the consequences of increased stormwater runoff. IESI should provide the post construction stormwater management (PCSM) Best Management Practices (BMPs) to mitigate potential volume and water quality impacts consistent with the requirements of DEP's Chapter 102 regulations. The PCSM plan must be accompanied with a schedule to install any post construction stormwater BMPs.

   IESI response: The Southeastern Realignment proposes some reconfiguration of Basin #2; however, the design essentially keeps in place the basin berm, including the outlet structure and emergency spillway. The basin outlet locations are unchanged and remain in compliance with the applicable storm water management requirements. As shown in Form I, stormwater Basin #2 provides adequate detention volume to attenuate peak rates of discharge in accordance with the Saucon Creek Act 167 Plan, thereby, protecting downstream waterways and streams from accelerated erosion and flooding. A post construction stormwater management plan consistent with the requirements of Chapter 102, including BMPs has been prepared and was reviewed and approved by the township and county.

DEP review: DEP's Waterways and Wetlands program has reviewed the response to the first EA review letter and determined that IESI has not addressed the volume increases that may be encountered as a result of the proposed landfill expansion. A volume control requirement is essential to mitigate the consequences of increased stormwater runoff. To accomplish this, the volume reduction BMPs must be designed and implemented to protect stream channel morphology; maintain groundwater recharge; prevent downstream increases in flooding and replicate the natural hydrology onsite before development to the greatest extent possible.

The volume control and water quality requirements included in the proposed rulemaking and retained in the final-form rulemaking are necessary to maintain and protect natural hydrology including velocity, current, cross-section, runoff volume, infiltration volume and aquifer recharge volume. These requirements will sustain damaging bank full flows. The requirements will also help prevent increases in peak runoff rates for larger events (2-year-100 year) on both a site-by-site and watershed basis. A volume control requirement is protective of water quality and also provides the benefits listed. IESI should provide the required post construction stormwater management BMPs to mitigate the volume of stormwater due to construction activities.

IESI has stated that infiltration of the volume difference from the pre-construction to the post-construction conditions cannot be accomplished due to the fact that the landfill is a "hot spot" location and infiltration is prohibited as per Chapter 137 of the Lower Saucon Code. However, this "hot spot" has not been confirmed by DEP, thus, infiltration of the increase in stormwater volume must be mitigated through post construction stormwater management BMPs. IESI should provide all applicable calculations regarding the post construction stormwater management BMP's necessary to determine if the proposed construction will meet DEP's Chapter 102 Regulations.

The Post Construction Stormwater Management Report states that water quality has been achieved for the unnamed tributary to East Branch of Saucon Creek for the local ordinance (Chapter 137 of Lower Saucon Code); however, the application does not mention meeting DEP's Chapter 102 Regulations regarding water quality. IESI should provide the required post construction stormwater management BMPs, calculations, details, notations for construction and any other information necessary for construction, to show that water quality has been achieved for the site.

PADEP "confirmation" of the landfill as a "hot spot" under the Lower Saucon Township Stormwater Management Ordinance is neither necessary nor appropriate. As part of the Township's LAP, Lower Saucon Township determined the landfill to be a "hot spot" land use at which infiltration is prohibited under the Lower Saucon Township Stormwater Management Ordinance. The Township has reviewed IESI's Post Construction Stormwater Management Plan and the BMPs proposed therein, and has determined that the proposal meets the volume reduction and water quality requirements (and all other requirements) of the Township Stormwater Management Ordinance, which ordinance is consistent with the applicable PADEP-approved and current Act 167 stormwater management plan for

this watershed. The project, therefore, is in compliance with 25 Pa. Code Sec. 102.8 (PCSM requirements), subsection (g)(2), which requires that a Post Construction Stormwater Management Plan contain "an analysis demonstrating that the PCSM BMPs will meet the volume reduction and water quality requirements *specified in an applicable Department approved and current Act 167 stormwater management watershed plan*" (emphasis added). (See Attachments 3 & 4)

Notwithstanding the above, to address the comments of the Department's Water Quality group, IESI has identified two BMPs to remove/retain the additional post-construction runoff associated with the Southeastern Realignment. See the attached calculations and narrative (Attachment 11). IESI is revising the Form 28 Closure Plan to incorporate the requirement to plant the trees, as already included in the approved Land Development Plan, and to incorporate a 'soil amendment' in the bottom of basins 1, 2, 3,4 and 6 following closure of the landfill.

3. **Form D, Section C - Wetlands:**

Question 1: IESI should verify the reduction in wetlands through the Army Corps of Engineers jurisdictional determination process. IESI should determine if wetlands onsite are Exceptional Value.

IESI response: The application includes a letter from Roemer Ecological Services, Inc. stating the wetlands are not of Exceptional Value (EV). IESI has also provided the jurisdictional determination relative to the wetlands from the Army Corps of Engineers.

DEP review: The Army Corps of Engineers' jurisdictional determination finds that there "may be" waters of the United States on the subject project site. DEP considers these wetlands as Exceptional Value since the East Branch of Saucon Creek has wild trout as per Pennsylvania Fish & Boat Commission. As per Chapter 105, Section 105.17(1)(iii), wetlands that are hydraulically connected to a stream that is a tributary to a stream that supports wild trout are considered Exceptional Value.

DEP's Waterways and Wetlands program has reviewed IESI's response to the first EA review letter and determined IESI has not fully addressed the reduction in size of the wetlands. IESI's response states, "As discussed in the letter from Roemer Ecological Services, the reduced size of the wetlands area is believed to relate entirely to the intervening installation of a public storage structure and the grading work done on that parcel and to the stream channel associated therewith." This response appears to identify the development of the public storage structures as the cause for the disparity in the two delineations; however, the response lacks detail into the areal impact and reduction of wetland resources. IESI needs to provide a comparison of the two delineations (in plan view) to show how the wetlands may be impacted by the public storage structures or other factors. Furthermore, any activities from 1991 through 2014 that have impacted the wetlands which may have contributed to a loss of the wetlands should also be further detailed in this analysis

The 1991 and 2014 delineated wetlands are shown on Attachment 5. Note that the 2014 area of wetlands is reduced to 1.32 acres as compared to the 1991 wetland of 3.74 acres. Looking at Figure 5, it is clear that a corner of the more westerly of the 2 storage buildings on the commercial lot along Applebutter Road (developed and owned by others) immediately southwest of Basin 2 is entirely within the 1991 delineated wetlands, as is a majority of the more easterly one. Additionally, significant areas of the associated driveways and site grading on that lot are within said former wetland area. It is also apparent that the stream channel was directly affected (including rechanneling) by the commercial lot development.

IESI Bethlehem Landfill has not undertaken any construction or grading to the east of the Basin 2 berm, and both the Basin 2 discharge point and discharge rates have not changed since IESI's acquisition of the site in the summer of 2000.

Moreover, the groundwater abatement (pump and treat) system that was included with the 1993 Phase III approval was installed by the City of Bethlehem in the early 1990's and has operated continuously since that time. Bethlehem Landfill has not altered the operation of that system.

As previously stated, Bethlehem Landfill has not impacted the wetlands in the southeastern corner of its property.

4. **Form D, Section J – Traffic:** IESI provided a traffic study and concluded that the proposed expansion will not increase vehicular trips; although there will be deficiencies in the design year 2025, these deficiencies are not due to the expansion of the landfill; rather, they are the result of the substantial nearby developments that are under construction. IESI should provide more detailed information on the trucks that will be hauling cover soil and construction materials to the site for the Southeastern Realignment project.

IESI response: A letter dated August 18, 2015 from Pennoni Associates projects 50 trucks will deliver cover soil an average of 6 days per month. Given the number of vehicles and duration of the deliveries of soils each month, coupled with the delayed timing and corresponding reduced traffic impacts associated with the Majestic and LVIP VII Developments, the additional soil trucks associated with the Southeastern Realignment project are not expected to impact the traffic route and study intersections.

DEP review: Pennoni Associates states that they are waiting for additional information on the Majestic Development schedule. It is not clear whether or not there is more traffic information to be evaluated. It is not appropriate to average out the 50 trucks received 6 days a month to 13 trucks a day as that is not how they arrive. IESI should describe how 50 trucks on the 6 days they are received will impact traffic.

Attachment 6 hereto is a January 11, 2016 letter report by Pennoni Associates which evaluated the traffic impacts associated with this project, including not only from the projected waste delivery vehicles but also from

the projected soils and construction materials delivery vehicles. The truck counts associated with said materials deliveries are presented on page 4 of that report. Pennoni's conclusion remains that the project "...will have little to no impact on the traffic route....". This documentation similarly was presented to and reviewed by the Township and is included with the LST LAP approval of this project.

In addition, in response to a condition of the LST LAP, per Pennoni Associates July 30, 2016 letter report, IESI evaluated the accident history and roadway curves/signage adequacy along the haul route (Attachment 7). This information was forwarded to PennDOT, and per Attachment 8, PennDOT on September 23, 2016 concurred with Pennoni's evaluation.

5. **Form D, Section M – Air Quality Impact:**

Question 2 and 3: IESI did not describe the potential impacts from odors and dust. IESI should further evaluate the potential impacts from odors and dust. IESI does not describe any odor or dust control measures.

IESI response: The potential for odors and dust are discussed in Form G(A) of the application, and the Southeastern Realignment Plan Approval Application submitted to DEP's Bureau of Air Quality on July 8, 2015. The plan approval sets forth various measures, subject to review and approval by DEP's Air Quality Group, to prevent, reduce and control emissions to the maximum degree possible. The terms and conditions of the plan approval will be binding on IESI, and will be incorporated into the site's Title V operating Permit No. 48-00037.

DEP review: The mitigation measures should be included as part of the response to this section. The application should be a standalone document and not reference other applications or approvals.

See response to General Comment above, and Attachment 1.

HARMS/BENEFITS REVIEW COMMENTS
(E) = Environmental, (SE) = Social & Economic

Harms

1. **Truck Safety and Traffic Impacts: (SE)** IESI has identified truck safety and traffic impacts as a potential harm.

Proposed Mitigation: IESI evaluated current and projected traffic volumes and potential impacts pursuant to PennDOT's regulations and guidance. Based on this evaluation, IESI has concluded that there are no adverse traffic impacts associated with the proposed project. IESI has implemented a variety of measures to minimize and

mitigate known and potential harms related to truck safety, vehicle related nuisances and traffic impacts. These mitigation measures are outlined in the Transportation Compliance Plan (TCP) and/or Nuisance Minimization and Control Plan (NMCP).

DEP Review: Proper implementation of the TCP and NMCP could mitigate these potential harms. IESI should provide more detailed information on the trucks that will be hauling cover soil and construction materials to the site for the Southeastern Realignment project and provide an evaluation of the effectiveness of the TCP and NMCP in relation to truck safety and traffic impacts.

IESI response: A letter dated August 18, 2015 from Pennoni Associates provides more detailed information on the trucks that will be hauling cover soil and construction materials to the site for the Southeastern Realignment project.

DEP 2nd review: Pennoni Associates states that they are waiting for additional information on the Majestic Development schedule. It is not clear whether or not there is more traffic information to be evaluated. It is not appropriate to average out the 50 trucks received 6 days a month to 13 trucks a day as that is not how they arrive. IESI should describe how 50 trucks on the 6 days they are received will impact traffic. IESI should describe how they ensure that these trucks do not arrive overweight.

See response to #4 above.

Note also that all soil and construction material trucks will have weight slips and are required to comply with all applicable standards and laws.

2. **Nuisances – Leachate: (E)** The generation of leachate and the potential for groundwater contamination is a known potential harm of a landfill operation. Public comment indicates additional leachate generation in unlined areas of the landfill during exposure of old waste and for additional leachate flow in the detection zone of the Phase III area is also a concern.

Proposed Mitigation: IESI undertakes numerous measures to minimize and control potential nuisances associated with the operation of a solid waste disposal facility. These mitigation measures include: use of a liner system, leachate management system, groundwater monitoring system and groundwater abatement system.

DEP Review: Leachate generation is a known harm of landfill operations. IESI should propose additional mitigation to address the potential for additional leachate generation in the unlined areas of the landfill during exposure of old waste and for additional leachate flow in the detection zone of the Phase III area.

IESI response: Aside from the installation of the horizontal collectors or headers in the Old Landfill Areas, the intermediate cover beneath the Old Cap will remain in place; thus old waste will not be exposed. IESI does not expect additional leachate generation during exposure of old waste as the approved procedures for removing the old cap limit the

potential for exposure during rain events. In the event that rainfall enters the work area during installation of the "piggyback" liner system, the Southeastern Realignment design maintains and preserves the existing leachate collection system in the older landfill areas. The groundwater abatement system south of the southeastern realignment area (as well as the Phase III and IV areas) will also continue to capture groundwater flowing from beneath the site, including any additional leachate which may result from said construction activity. For the same reasons discussed above, IESI does not expect additional flow in the detection zone of the Phase III area. Flow in this detection zone has been investigated and evaluated in previous reports and re-reviewed recently, concluding with the determination that IESI is continuing to manage current flows in accordance with DEP Regulations.

DEP 2nd review: DEP is aware that IESI is conducting further evaluation regarding leachate flow in the detection zone. DEP believes this information may be useful in addressing this potential harm.

While all Leachate Detection Zone (LDZ) flows at the site are being managed in accordance with applicable DEP Regulations, on September 21, 2016, Bethlehem Landfill submitted to DEP additional steps to be implemented relative to the elevated Phase III LDZ flows (Attachment 9). These steps include periodic cleaning of the anchor trench drains and recalibrating the flow measurement devices. Additionally, associated with the Southeastern Realignment liner construction in Cells SE-1A and B, possible stormwater intrusion into the eastern side of the Phase III LDZ will be eliminated by the welding of the new liner systems to the Phase III systems.

3. **Air Contaminants and Odors Generated during Exposure of Old Waste:(E)** Public comment indicates there is a concern that the potential for off-site air contaminants and odors will increase as a result of IESI's proposal to remove approximately 26 acres of cap from previously closed areas of the landfill thereby exposing old waste to the atmosphere.

Proposed mitigation: IESI has not identified this as a potential harm or proposed mitigation measures.

DEP review: DEP has evaluated this harm and agrees there is an increased potential for generating odors during the removal of cap from closed areas of the landfill. IESI has measures in place to minimize and control odors from the landfill; however, IESI should provide detailed information on what additional measures will be undertaken if off-site air contaminants and odors become an issue during cap removal.

IESI response: The cap removal procedures that were approved in the minor modification dated July 17, 2013 will remain in place. Aside from installation of horizontal collectors or headers in the old landfill areas, the old waste will not be exposed. If odors are detected, the waste surface will be sprayed with an odor reactant

chemical and/or covered with a spray-on alternate daily cover material such as Posi-Shell to control gas emissions. The materials and equipment required for either of these techniques will be positioned near the active work area so that they can be deployed rapidly.

DEP 2nd review: The July 17, 2013 permit modification was for removal of ½ acre of cap, this proposal is for 26 acres. Cap removal procedures specific to the proposed project should be included in this application.

See response to General Comments above.

4. **Visual Impacts: (SE)** Public comments indicate visibility of the landfill from the Delaware and Lehigh Canal Towpath, homes and the park in Steel City is a concern.

Proposed mitigation: IESI has not identified this as a potential harm or proposed mitigation measures.

DEP review: DEP has evaluated this harm and agrees that there is a potential for visual impact with the increase in landfill height. IESI should define this potential harm and propose appropriate mitigation measures.

IESI response: IESI has performed an updated and expanded visual impact analysis in connection with the proposed southeastern realignment application.

DEP 2nd review: It appears from IESI's visual analysis that the proposed expansion will have a visual impact on homes and traffic in the immediate vicinity of the landfill. Therefore mitigation measures are required.

The proposed modification will be visible from homes in the immediate vicinity of the landfill. As a result, in conjunction with the LAP process, visual mitigation measures include:

a. **The Southeastern Realignment grading and access road were modified to shift the access road traffic further away from the homes;**
b. **The Landfill has finalized and executed an agreement to purchase the Bresnick home that is immediately adjacent to the landfill at the southeastern corner of the site; and has offered to purchase the neighboring property to the East (Severen).**
c. **The plan sheets 12 and 18 of the approved Land Development Plan depict the vegetative screening to be planted along the southeast and eastern sides of the project footprint (Attachment 10), in part to provide visual screening from these properties and from Applebutter Road.**

With respect to the more remote northern and northwestern homes, the Landfill has agreed to the following condition associated with the LST approval of the Land Development Plan for this project..."IESI shall ensure that its site elevations do not

cause any portion of the waste mass or final grading within the Southeastern Realignment to be visible above the existing tree elevation by persons at view point locations 1, 2, 3, [along canal] SC 1 and SC 2 [in Steel City] to elevation points 1 and 2 [high points on landfill] as depicted in the Lines of Site [sic] Plan in Exhibit IESI-30, and shall ensure that the site visibility is consistent with IESI-30." This condition is essentially the same as existing Permit Condition #20 of the approved Phase IV Modification, as clarified by the Department's letter of May 16, 2003.

Benefits

1. **Local Benefits Attributable to Payroll Payments: (SE)** IESI has identified that the project will result in direct employment for a number of area residents and indirect employment through locally purchased supplies and services. The economic benefits attributed to payroll taxes associated with the Southeastern Realignment project is approximately $715,000 per year, and will contribute over the 5.5 year extended site life.

   DEP Review: Indirect employment is not considered a benefit of the project. The continued employment of landfill employees will be considered to be a Social and Economic benefit of the project. IESI should better define and quantify this benefit.

   IESI response: IESI contends that indirect employment is a properly quantified and generally accepted economic concept and as such remains a benefit of the project.

   DEP 2nd review: In its first review, DEP was looking for the direct employment benefit to be better defined. In order to consider direct employment as a benefit, the description must be concrete and particularized. Unless IESI can define the direct employment benefit specifically, DEP will not consider this as a benefit. Unless IESI can show that without the expansion, there will be indirectly employed individuals that will be unemployed; DEP cannot consider this as a benefit.

   IESI respectfully disagrees with the Department's assertion and contends that the direct employment benefit is already appropriately and adequately defined as amounting to $619,313 in labor, $85,418 in benefits, and $9,996 in 401k benefits, annually, to the 10 local employees at the Bethlehem Landfill. It is inappropriate for the Department to request the individual pay rates, types and amount of benefits and terms of employment for each of these private individuals, nor is such information required to satisfy the Pennsylvania Municipal Waste Regulations at 25 PA Code §271.127.

   Similarly, indirect employment is a well-established and sufficiently proven economic concept, and as such, it is inappropriate for the Department to suggest that IESI must identify specific indirectly employed individuals that will become unemployed without the expansion, nor is such information required to satisfy the Pennsylvania Municipal Waste Regulations at 25 PA Code §271.127.

2. **Maximizing Use of Current Disposal Area: (E)** IESI has identified, as an Environmental benefit, the extended operating life of an existing, permitted municipal waste landfill, allowing for continued provision of all of the environmental services which the site provides by maximizing use of the current disposal area without the need to create or improve existing public and private infrastructure.

DEP Review: Maximizing the disposal capacity within the currently permitted area is not a benefit. It is an action that avoids or minimizes the extent of the environmental and social and economic harms. DEP's Technical Guidance Document No. 254-2100-101 states that an activity or mechanism which reduces or prevents harm created by the facility does not amount to a benefit.

IESI response: IESI disagrees with DEP's position, and contends that maximizing the use of the existing landfill area is not an activity or mechanism to reduce or prevent harm, but a beneficial and environmentally conservative approach to utilizing air space above the permitted contours of the existing landfill, while avoiding the use of virgin natural resources or constructing new infrastructure to accommodate the waste disposal needs of the community and region.

DEP 2nd review: IESI would have to definitively show that without the expansion, that there would have to be a new landfill constructed using virgin natural resources to accommodate the disposal needs of the community or region.

IESI respectfully disagrees with the Department's position and contends that there is no requirement in the Pennsylvania Municipal Waste Regulations at 25 PA Code §271.127 that would require the type of showing suggested.

3. **Beneficial Use of Landfill Gas: (E)** IESI has identified, as an Environmental benefit, that they provide landfill gas to a third party for generation of electricity for public consumption.

DEP Review: Landfills are required to control gas that is generated by operation of their facilities. DEP's Technical Guidance Document No. 254-2100-101 states that an activity or mechanism which reduces or prevents harm created by the facility does not amount to a benefit. Beneficial reuse of landfill gas is mitigation of gas that is created by the landfill and an expected business practice and as such is not considered to be a benefit of the Southeastern Realignment project.

IESI response: IESI disagrees with DEP's position. The assertion in the guidance document that generation of electricity from landfill gas is simply mitigation of a harm is based on a determination by a former DEP secretary and is unsupportable on the facts, has no basis in law and is contrary to the case law cited by DEP.

DEP 2nd review: DEP maintains the position stated in the 1st Review.

No response required.

4. **Contributions: (SE)** IESI has identified, as a Social and Economic benefit that they support many community activities in a variety of ways, including through direct financial support to civic clubs, libraries, and other local institutions. The landfill also donates to a variety of local charities and supports their fund raising events, such as the local Fire Department, American Cancer Society fund drive, and Community Earth Day events. In addition, the facility provides ten (10) $1,000 environmental scholarships each year to students from area high schools towards their college education.

   DEP Review: Charitable contributions and scholarships are not considered to be benefits of the Southeastern Realignment project. [Berks County v. Department of Environmental Protection, 894 A.2d 183(Pa. Cmwlth. 2006). Eagle Environmental II, L. P. v. Department of Environmental Protection, 884 A.2d 867(Pa. 2005)]

   IESI response: IESI contends that the referenced cases are distinguishable as the charitable contributions and scholarships proposed by IESI in connection with the application and contingent upon approval of the proposed southeastern realignment project and rely upon the revenue from the proposed project to fund the continuation of these benefits.

   DEP 2nd review: DEP maintains the position stated in the 1st Review.

   No response required.

We trust that this response will allow your office to complete the EAP review and approval process. In the event that you have any questions, please do not hesitate to contact us.

Very truly yours,
MARTIN & MARTIN,INCORPORATED

Richard M. Bodner, P. E.

enclosures
cc: IESI Bethlehem
LAW
Lower Saucon Township
Northampton County

Attachment 1

IESI BETHLEHEM LANDFILL (The Landfill)

Southeastern Realignment - Cap Removal & Waste Relocation Plan and Procedures

I. GENERAL PROCEDURES

The potential exists for the site to encounter old refuse or other waste during the construction of the Southeastern Realignment cells and associated gas system. Any waste encountered during the construction will be excavated and disposed of within the lined footprint of the active landfill. This plan is essentially the same as was implemented at the site during the construction of Cell III-D, Cell 4-F, and Basin 7. All of these procedures are the responsibility of the Landfill, which may assign duties to contractor(s), but which will remain under the ultimate control of the Landfill.

Contracts issued by the Landfill for this type of work will contain, in addition to the procedures in this Section I, the General Conditions included herewith as Section II.

LITTER CONTROL

The necessary litter fences will be constructed and placed to ensure positive control of litter from the excavated refuse. The excavated area litter should not be a problem during the trucking or pushing of refuse. It should have the consistency of a mulch rather than freshly disposed of trash. Should the consistency change, the appropriate action will be taken. Litter will be removed from the fences weekly, or more frequently as necessary.

DUST CONTROL

During dry, dusty periods of the year, and at any time when required, a water truck will be utilized to apply water to any areas which are generating dust. Additionally, foam or chemical dust suppressants may be used, subject to DEP approval.

ODOR MANAGEMENT

In addition to the procedures outlined in the Nuisance Minimization and Control Plan (NMCP), odor management during waste exhumation or cap removal will be implemented as follows:

> During waste relocation, removal of capping, and/or during the installation of the gas collection system in old waste, a third party independent Quality Assurance/Quality Control Consultant (QA/QC) will be on-site to monitor and document these activities. Additionally, approximately every 2 hours during these activities the QA/QC will monitor H_2S emissions from the active work area(s) using a Hydrogen Sulfide Analyzer (HSA) capable of measuring in parts per billion (PPB), such as a Jerome Model J605 or

approved equal. The sampling frequency may be increased at the discretion of the QA/QC based on weather, work conditions, or odor detections.

HSA readings will be taken by the QA/QC at the property line fence closest to the active work area as well as the property line fence downwind of the active work area. If the QA/QC records a H_2S emission reading of 30 PPB or more, the QA/QC will immediately notify the site and/or the contractor that the activities at the work area(s) need to be addressed as outlined below to reduce H_2S emissions. Once H_2S levels have been reduced, the site/contractor can continue with the activity while keeping in mind they may need to minimize the area exposed to ensure that H_2S emissions stay below the threshold level.

Attached is the form that will be utilized for H_2S monitoring (H_2S Monitoring Form).

Whenever possible, waste relocation operations will be carried out in the period from October 15 to April 15. The exposed refuse will be covered with soil, tarps, foam products, or similar materials as necessary to contain odors. In addition to the QA/QC monitoring, odors will be monitored by daily "odor checks" at the waste exhumation face, the working face, and the site perimeter by landfill personnel. If any odors are detected at or near the site perimeter, the landfill shall immediately address the situation, indicating in the log the location of the detected odors and the steps taken to control the odors. Any such occurrences shall be noted in the landfill's daily operations log. If at any time, odors do become a problem, odor suppressants, lime or other controls will be applied. In addition, if needed Bethlehem Landfill or its contractor(s) will implement some or all of the following:

* operate multiple foggers with odor suppressant the waste exhumation area, and/or at the active work face
* spread powdered lime to the waste exhumation area, and or at the active working face
* operate line sprayer(s) with odor suppressant as needed at the waste exhumation area, at the working face, and/or along the site perimeter where appropriate.

CAP REMOVAL

Under the supervision of the third party independent Quality Assurance/Quality Control Inspector, personnel will expose the cap liner system at the perimeter of the cap where it will be cut/removed. The cap will be cut and the edge covered and marked for future cap tie-in or removal efforts. The cover soils will be removed for use in landfill activities. The cap liner system will then be removed from the area, which area will be limited to that which can be managed within a day or two. Intermediate cover beneath the membrane will remain in place. The landfill will have a water truck capable of spraying odor control liquids as needed to control odors. The landfill gas system will remain operational during the cap removal and placement of the new "piggyback" liner system.

NOISE

The relocation of trash will be generally limited to the operating hours of the facility per the permit, and will be conducted in compliance with the noise regulations of Lower Saucon Township. The noise associated with this activity will be consistent with other operations on site.

LEACHATE MANAGEMENT

Any leachate pockets or seeps found during the trash removal and relocation to the lined cells will be handled through the site's leachate collection system. Precautions will be taken to ensure that no leachate will flow or migrate from the working area. IESI Bethlehem Landfill or its contractors will use the equipment on site to ensure there is no migration. If necessary to contain leachate, a pit or sump will be dug at the active face of each relocation area, from which leachate will be pumped either directly to, or into a tank truck for hauling to, the leachate collection system. The pit will either be a concrete sump or be membrane lined, as may be necessary.

TRENCHING

Excavations (trenching) required to abandon/add gas wells will be done one at a time to prevent infiltration of rainfall.

STORMWATER MANAGEMENT

The stormwater runoff will be diverted around the working face of all cells and refuse removal areas under construction. Precautions will be taken to ensure there is no runoff from areas outside the working area infiltrating into exposed trash or waste.

TRAFFIC

Waste relocation procedures will proceed by the hauling of refuse from the relocation areas to the lined cells. This traffic will not be directed to the scale area, nor will it utilize the access roads or public roads. Therefore, traffic should not be a problem at the site. In order to accommodate the additional volume of activity at the working face, an additional compactor, and/or truck for delivery of cover material may be utilized.

SCHEDULE OF RELOCATION

The schedule for relocation of the old trash will coincide with the earthwork schedule necessary to prepare subsequent cell(s) for construction.

II. GENERAL LANDFILL-CONTRACTOR CONTRACT CONDITIONS RELATED TO CAP REMOVAL & WASTE RELOCATION - SOUTHEASTERN REALIGNMENT

2.01 HEALTH AND SAFETY REQUIREMENTS

A. Project personnel shall become thoroughly familiar with and follow this Plan.

B. The Owner and Project Manager for the projects will be IESI Bethlehem Landfill.

C. Project management will be the responsibility of the Project Manager. The Project Manager will coordinate and manage all major activities. Day to day activities will be coordinated and managed as directed by the Project Manager. The CONTRACTOR should be in constant communication with the Project Manager.

D. The CONTRACTOR will work closely with the Project Manager to assure that all work is carried out in the safest manner possible. The CONTRACTOR will be responsible for assuring the overall implementation and enforcement of the plan, air monitoring, accident or incident investigation/reporting, contractor/employee compliance, and similar activities.

E. The CONTRACTOR and his workers must be knowledgeable about hazards to which they may be exposed during this project, as required by the OSHA Hazard Communication (HAZ-COM) Standards and the OSHA Hazardous Waste Operations and Emergency Response Standard. All OSHA, and other applicable regulations shall be followed by CONTRACTOR.

F. All on-site personnel, if required to wear respirators, will be fit tested and instructed in the proper use, cleaning, storage and limitations of their respirators.

G. All CONTRACTOR's personnel shall adhere to the safety practices for their respective specialties. Workers shall also exercise caution when working in adverse weather, on rough or slippery terrain, when operating on or around machinery and when vision and mobility are impaired due to the use of protective gear. The integrity of protective clothing shall be maintained and workers shall realize the increased difficulty in communicating when wearing a respirator (if its use is necessary). The following shall also be noted:

1. In unknown situations, always assume the worst and plan responses accordingly.

2. Use the buddy system; establish and maintain communication by use of hand signals, radios or other means as necessary.

3. Minimize contact with excavated or other potentially hazardous materials or liquids. Do not place equipment on tanks, drums or on the ground. Never sit or climb on tanks, drums or other vessels and containers.

4. Use disposable protective items when possible to minimize risks during work.

5. Smoking, eating and drinking are not allowed after entering the work zone and before personal decontamination.

6. Work breaks should be planned to prevent stress related accidents, fatigue or hot/cold environments.

7. Workers shall review and follow all site specific rules such as those dealing with the use of personal safety equipment (safety glasses), the use of climbing devices (ladders), sign in/sign out procedures, access, etc.

8. Conflicting situations between work requirements and safety procedures must be resolved by the CONTRACTOR and OWNER.

9. Unauthorized breaches of specified safety protocol will not be allowed. Personnel unwilling to comply with established safety procedures will not be allowed to continue to work at the site.

10. Be observant of the surroundings and also of others. Extra precautions are necessary when using protective gear due to reduced vision and hearing.

11. Use of contact lenses by workers are not allowed during any activities.

12. The wearing of a respirator will require the removal of all facial hair except small mustaches that are within the sealing surface of the respirator.

13. Changes in contingency plans will be posted to notify all personnel of any modifications to safety protocol related to changing site conditions.

14. When in doubt, withdrawal and re-assessment is the preferred course of action when encountering any potentially hazardous situation.

15. Be aware that chemical contaminants may mimic or enhance symptoms of other illnesses or intoxication.

16. The CONTRACTOR will maintain a daily log of meetings, facts, incidents, data, etc. relating to the project. Records will remain at the site during the duration of the project.

17. Observance of applicable OSHA, EPA and general good safety, health and specific equipment use practices is mandatory.

H. It is anticipated that all work will be performed using Level D personnel protective equipment as described below. Level D personnel protective equipment consists of the following unless otherwise recommended by the CONTRACTOR and approved by the OWNER.

1. Coveralls (disposable coveralls may be desirable);
2. Safety boots or substantial shoes/boots (as applicable);
3. Safety glass or goggles;
4. Hard hat and,
5. Work gloves

2.02 ODOR CONTROL

A. In the decomposition of solid waste, gases may be produced creating possible pungent odors when exposed to the ambient air. The CONTRACTOR shall maintain safe working conditions in the presence of the gases and minimize odors migrating off-site which will cause public concern. Odor control from the project is critical.

B. The CONTRACTOR shall employ methods of odor control that must include, but not be limited to, the following:

1. Minimize the exposed area of refuse during relocation operations;
2. Apply cover (tarps, foam, and appropriate thickness of cover material, etc.) over any exposed trash at the end of each day and during project delays;
3. The use of odor suppressants. At least two "foggers" or equivalent (e.g. sprayer on arm of trackhoe) must be provided by the CONTRACTOR. The foggers must be strategically placed and used as directed by the OWNER.
4. The placement of lime on odor producing areas.

C. Based on previous projects, all soil needed for cover should be available from the relocation area by the stripping/re-use procedure. Any additional soil material needed must be taken from the soil stockpile as directed by the OWNER.

2.03 LEACHATE/STORMWATER MANAGEMENT

A. In general, the CONTRACTOR shall:

1. Collect all leachate in the refuse excavation area in such a manner as not to endanger public health, property or any portion of the work under construction or completed. The collected leachate must be pumped and/or

transported to the tie-in point provided by the OWNER. Stormwater must be routed to the appropriate Sediment Basin.

2. The CONTRACTOR must provide and maintain pumps, sumps, suction and suitable discharge lines, temporary storage and other dewatering system components necessary to convey leachate away from any excavation, as approved by OWNER.

3. Prior to beginning refuse relocation excavation activities, make visual observations or utilize survey data to establish a method of routing stormwater from the work areas to the Sediment Basin and containing leachate within to be reviewed for approval by the OWNER. Earthen dikes may be constructed surrounding the work area, and located to minimize the area inside the dikes, thus reducing potential leachate generation. The area immediately outside the dike will be sloped away from the dike to direct stormwater away from exposed refuse to the site stormwater management system and appropriate Sediment Basin.

4. Maintain, at all times, proper and effective sedimentation and erosion control around the Refuse Excavation Area and the Soil Stockpile Area as approved by State and Local Authorities. This shall include, but not be limited to placement of silt fencing and/or other means of silt retention during construction, containment of all excavations and stockpiles, directing, and channeling of all stormwater to Sediment Basins, and all other methods to prevent silty run-off from reaching a receiving water course.

2.04 LITTER CONTROL

A. The uncovering of the existing refuse may cause litter to be blown away from the working area. The CONTRACTOR shall use litter fences and/or windscreens downwind of the immediate work area to contain blowing litter for pick-up and disposal.

B. A temporary cover shall be placed over exposed waste to prevent blowing litter as well as minimize odors. As indicated previously, cover (tarps, foam, an appropriate thickness of cover material, etc.) shall minimally be placed over all exposed waste at the end of each operating day.

C. Litter may also be scattered during on site transportation of the refuse to the new landfill Pad(s). If this does occur, the CONTRACTOR shall construct additional litter fences or cover the loads. The CONTRACTOR will be responsible for continuously policing the roadway to control litter.

D. Any refuse which is blown, tracked, etc. away from the working area must be collected by the CONTRACTOR by the end of each day and disposed in the active Pad(s) or another location approved by the OWNER.

2.05 "SUSPECT" MATERIAL ENCOUNTERED DURING REFUSE EXCAVATION

A. Due to the inherent nature of excavating old refuse, the CONTRACTOR shall be constantly aware of the potential for encountering, not only leachate, but special wastes termed "suspect" materials which may need special consideration for handling and disposal. "Suspect" materials may include, but not be limited to, containers or drums (crushed or whole), liquids or leachate, strange-shaped or typically industrially generated items, uncommon odors, significant levels of volatile organic compounds (VOC's) detected by instrumentation, soil uncommon to a sanitary landfill, powders, or material that looks like it could be an asbestos containing material (e.g., transit board, asbestos roofing or shingles, or pipe lagging).

B. If the CONTRACTOR unearths "suspect" material, appropriate personal protective equipment must be utilized assuming the worst case scenario. The OWNER's representative shall be notified immediately. The OWNER will notify the PADEP Wilkes-Barre Regional Office within 24 hours.

C. Upon encountering "suspect" material, the area in question shall be initially assessed by the OWNER. If the area is large, it may be cordoned off and prepared for onsite sampling. Dikes shall be formed around the area as appropriate to prevent infiltration of leachate of contamination of other fill by the "suspect" material. If the area is small, isolated and in the way of progress, the material shall be placed in a container for further evaluation and sampling.

D. "Suspect" materials will be evaluated and handled as necessary. The CONTRACTOR may be directed to place "suspect" wastes in the appropriate containers or cordon off the area. Sampling, testing and evaluating the "suspect" material may be performed by the OWNER. If the "suspect" materials must be disposed off-site, the transportation and disposal costs will be the responsibility of the OWNER. If the "suspect" material may be disposed of on-site, the CONTRACTOR will relocate the waste in accordance with these Technical Specifications. No additional compensation will be paid for material disposed on-site.

Attachment 2

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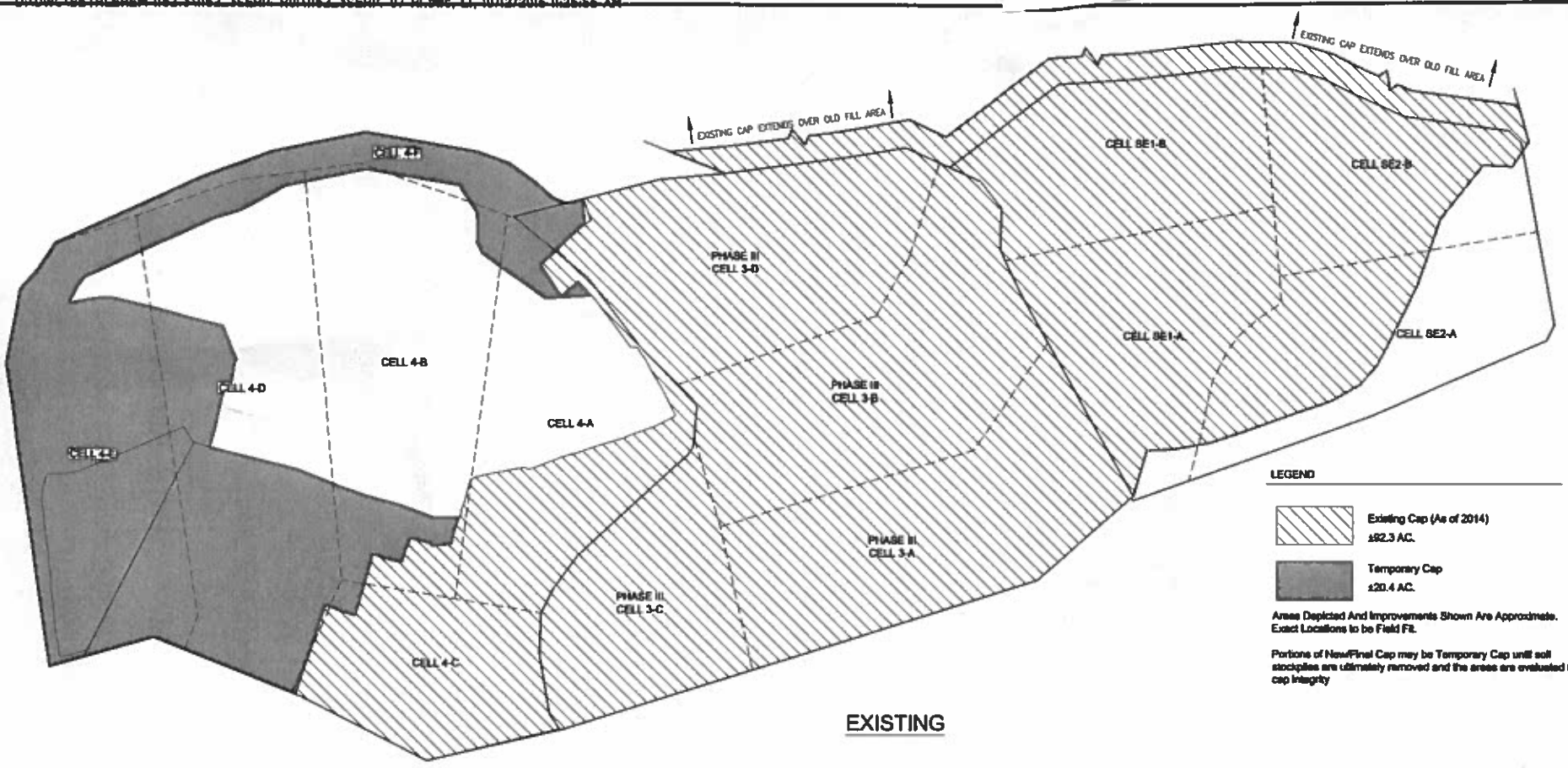

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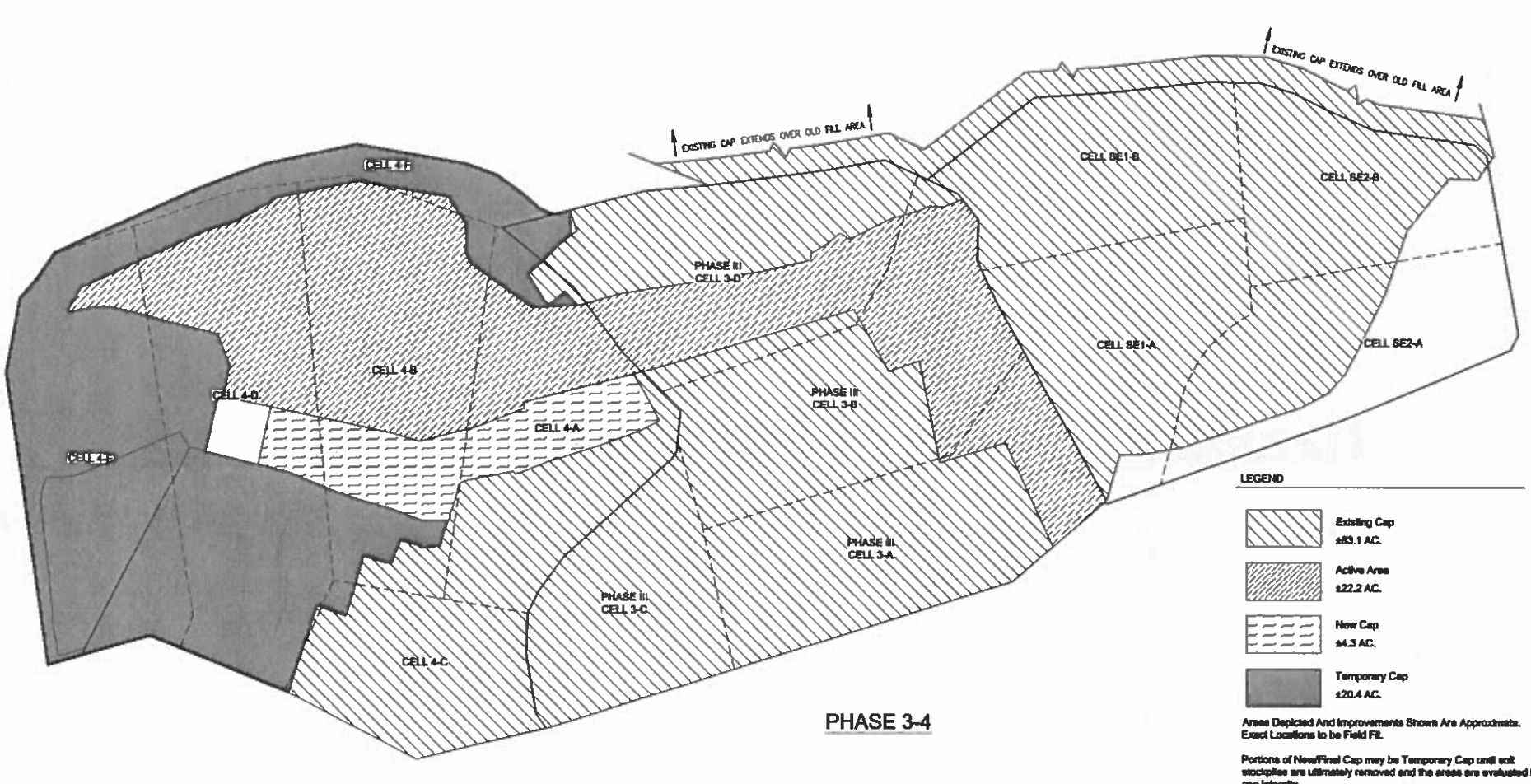

PHASE 3-4

PHASE 3-4 THRU SE1-A

- SOUTHEASTERN REALIGNMENT -

DRAWING NO. LF-26

SCALE: 1" = 200'

DATE: DECEMBER 2014

CADD FILE: 1162_3SER14-07 R1.dwg

martin and martin incorporated
37 south main street • suite A
chambersburg, pennsylvania 17201
phone: (717) 264-6759

PROJ. NO. 1162.3 | DSN. BY: | DWN. BY: JM/RMB | CHK. BY: RMB

APPROXIMATE CELL DEVELOPMENT/CLOSURE PLAN
(EXISTING - CELL SE1-A)

LOWER SAUCON TWP. NORTHAMPTON CO.

PA Bethlehem Landfill Corp.
A Progressive Waste Solutions Company
PENNSYLVANIA

NO.	REVISION	DATE
1	ACCESS ROAD / MSE WALL REDESIGN	6.16

SEAL

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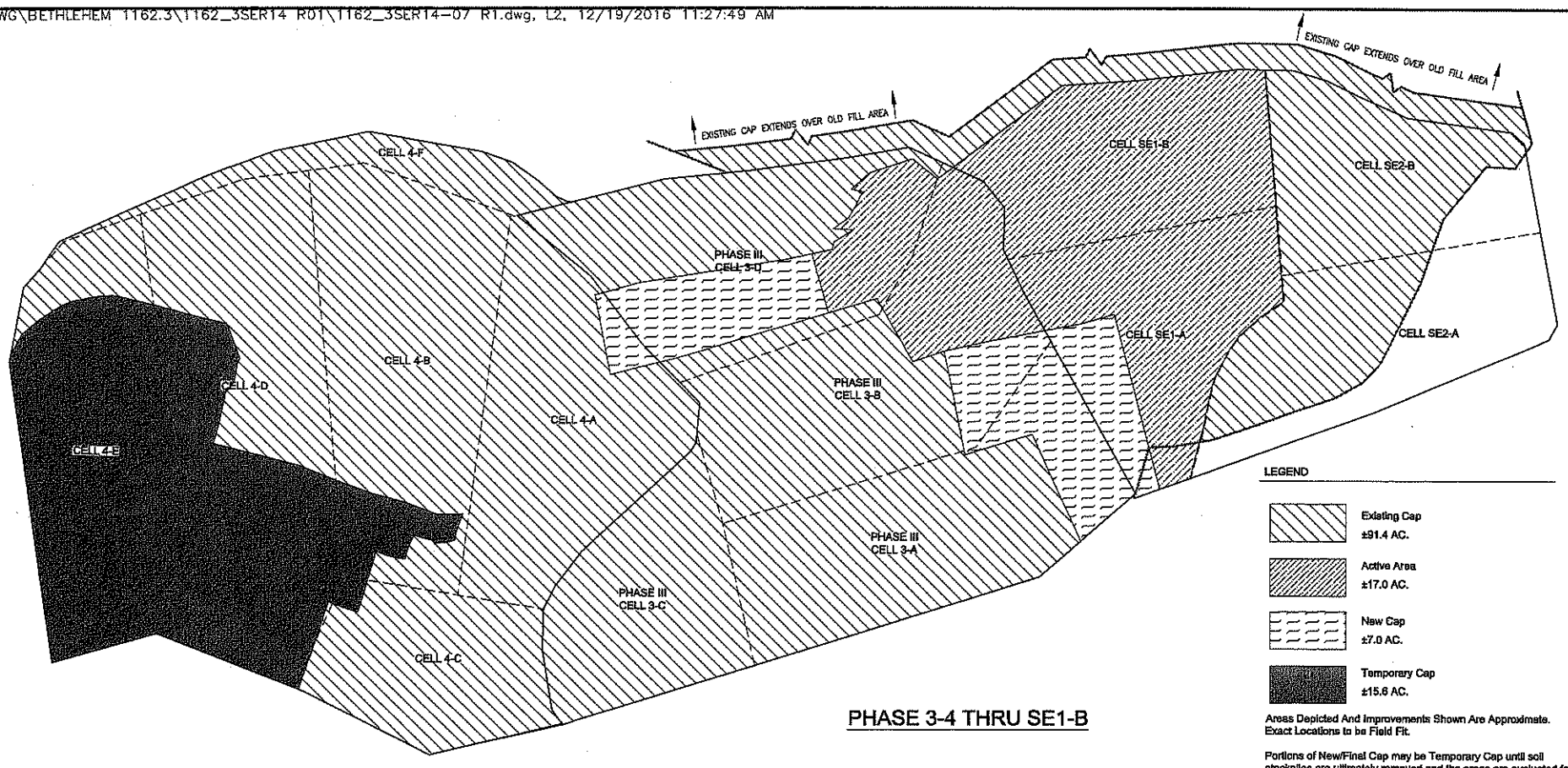

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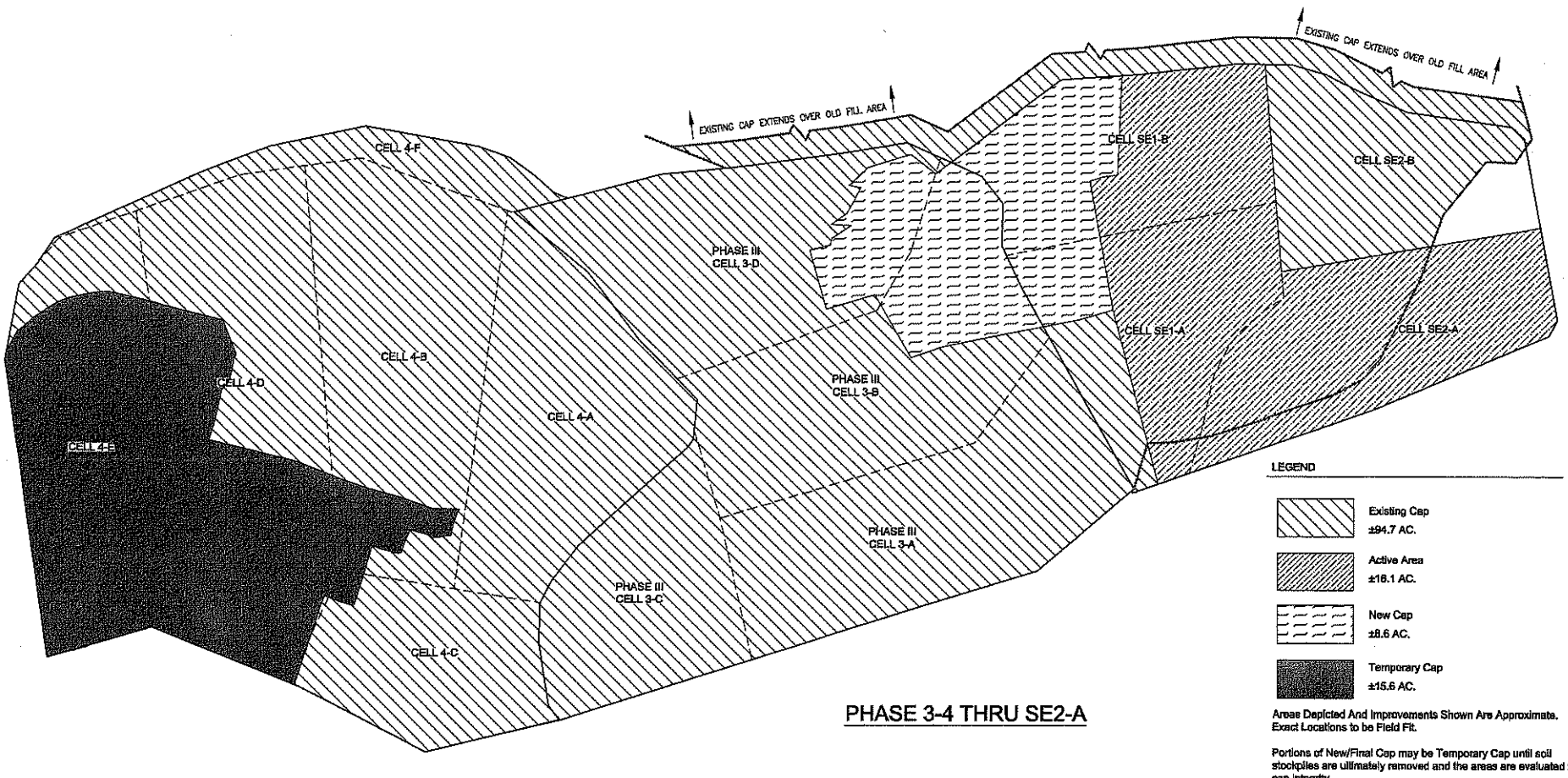

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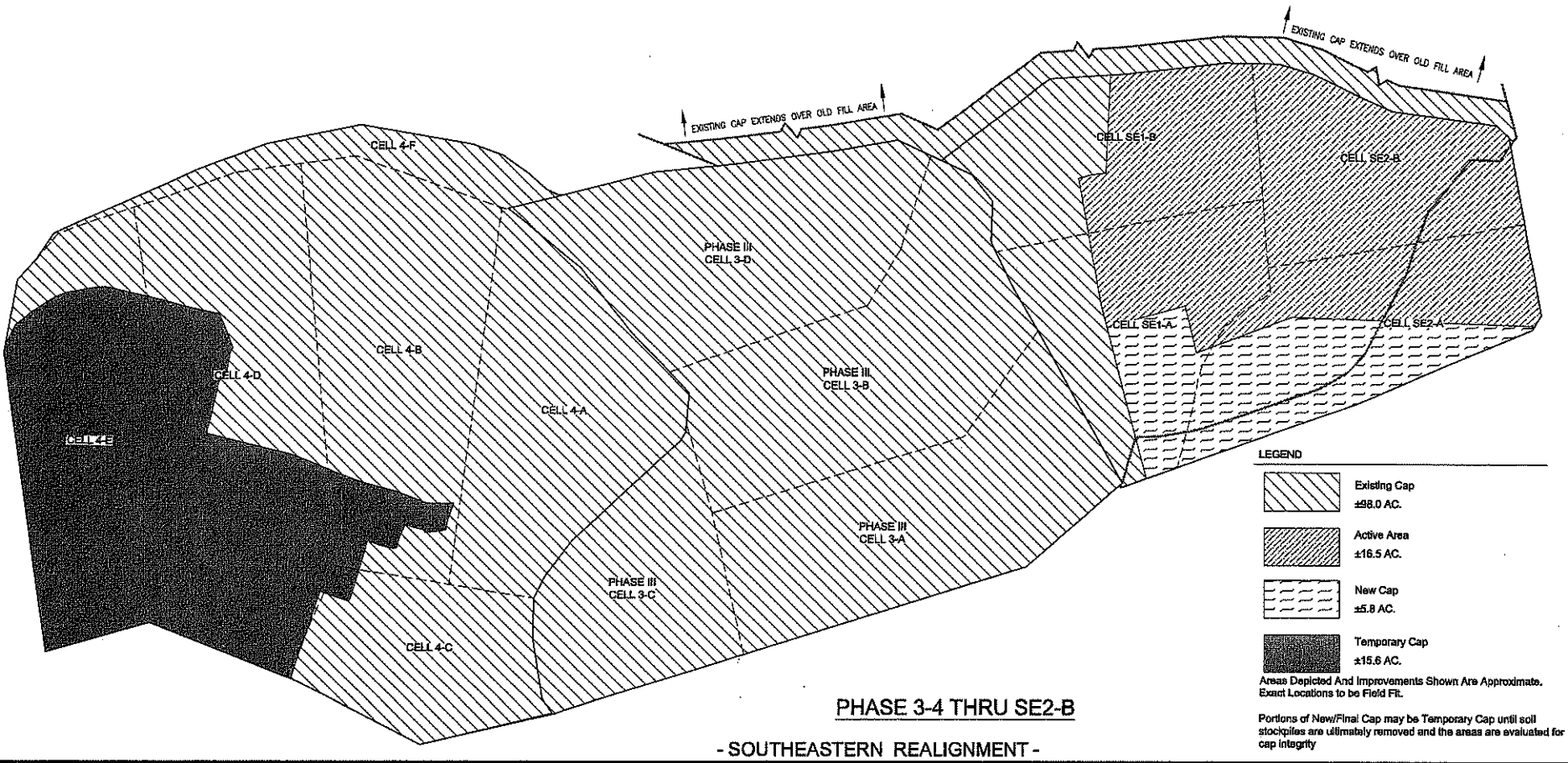

PHASE 3-4 THRU SE2-B

- SOUTHEASTERN REALIGNMENT -

DRAWING NO. LF-27

SCALE: 1" = 200'

DATE: DECEMBER 2014

CADD FILE: 1162_3SER14-07 R1.dwg

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chambersburg, pennsylvania . 17201
phone: (717) 264-6759

PROJ. NO.	DWN. BY:
1162.3	
DSN. BY: JM/RMB	CHK. BY: RMB

APPROXIMATE CELL DEVELOPMENT/CLOSURE PLAN
(EXISTING - CELL SE2-B)

LOWER SAUCON TWP. NORTHAMPTON CO.

PA Bethlehem Landfill Corp.
A Progressive Waste Solutions Company
PENNSYLVANIA

NO.	REVISION	DATE
1	ACCESS ROAD / MSE WALL REDESIGN	6.16

SEAL

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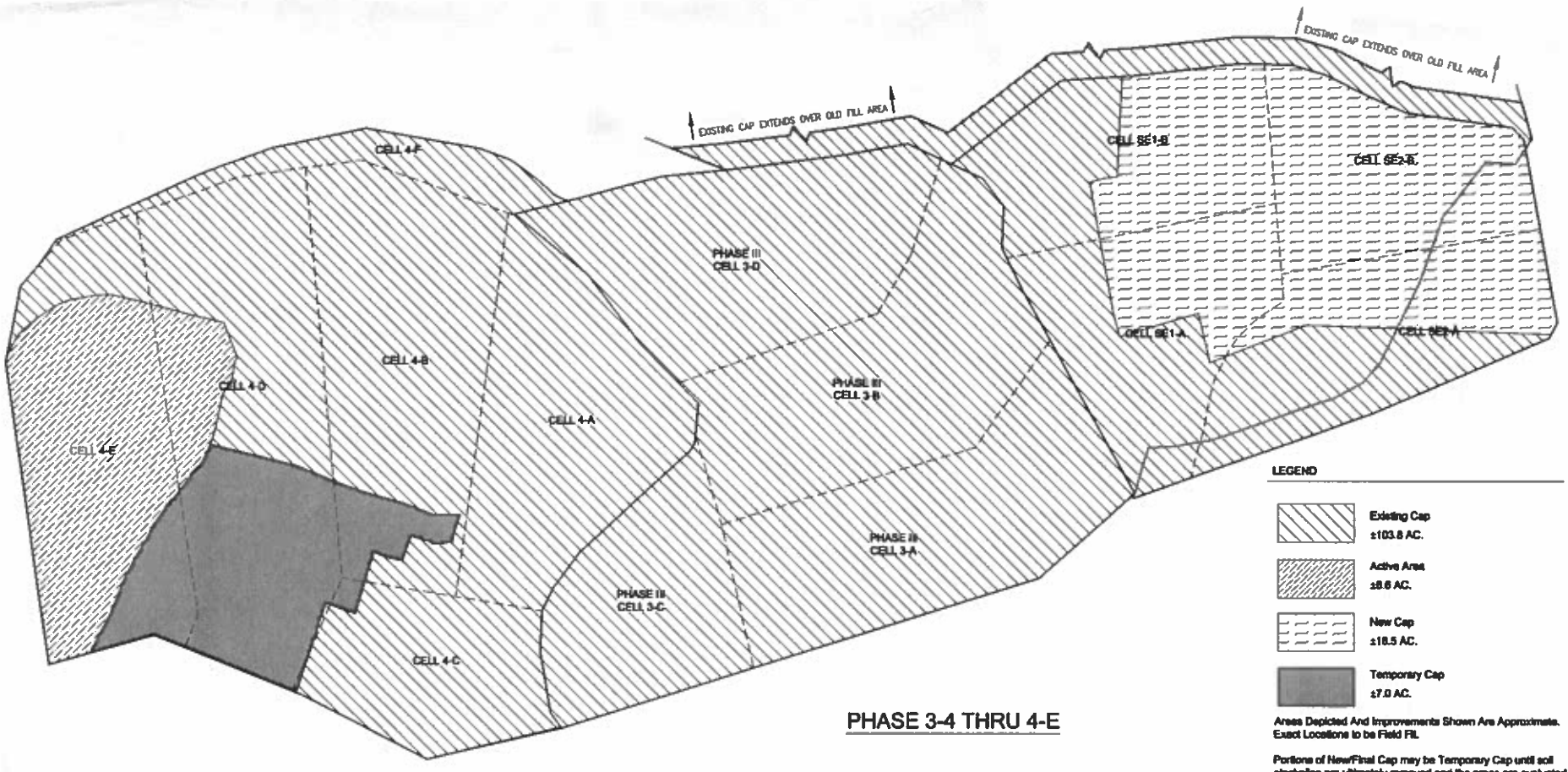

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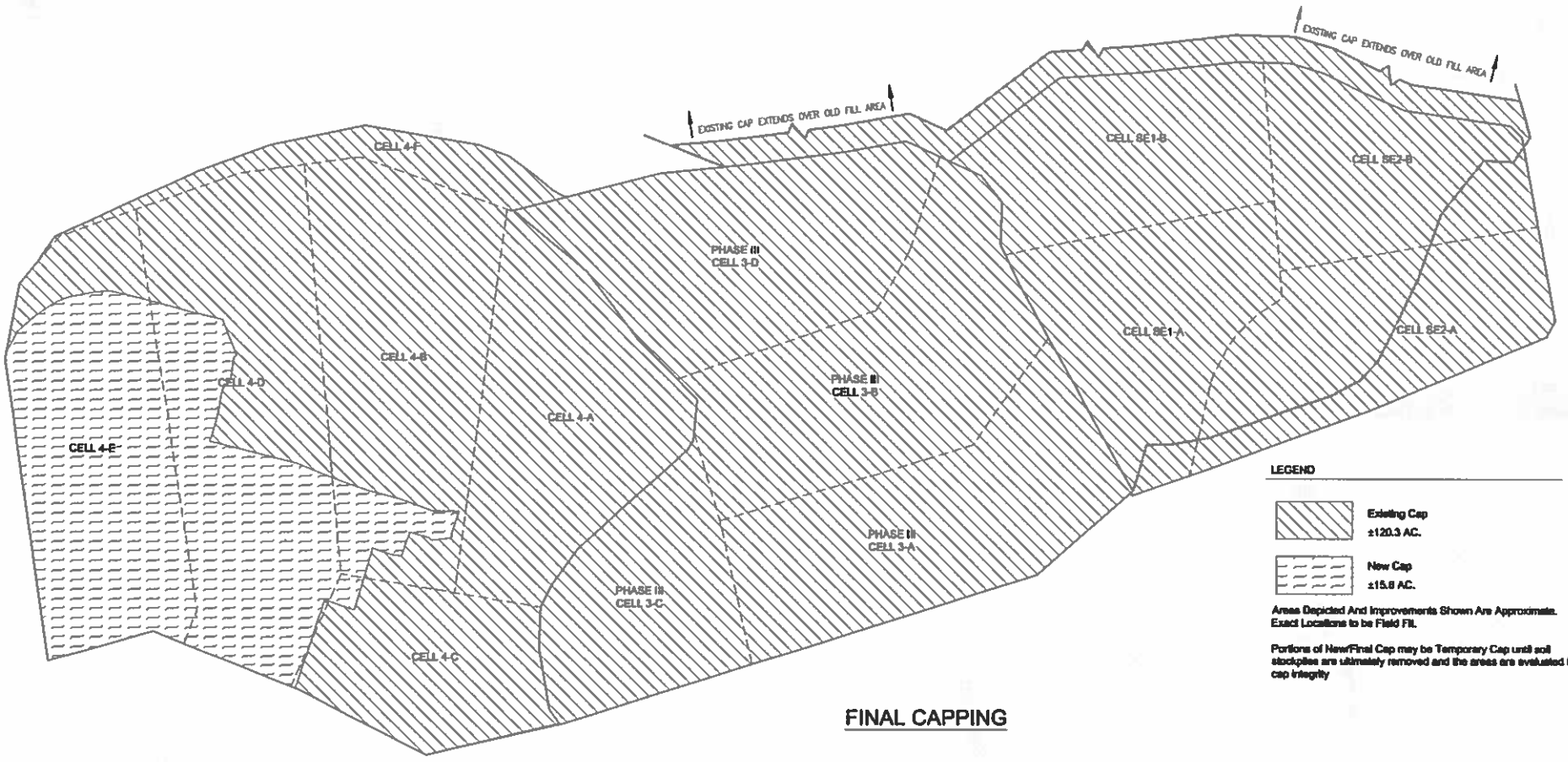

FINAL CAPPING

N

- SOUTHEASTERN REALIGNMENT -

DRAWING NO. LF-28

SCALE: 1" = 200'

DATE: DECEMBER 2014

CADD FILE: 1162_3SER14-07 R1.dwg

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PROJ. NO. 1162.3 | DWN. BY: | DSN. BY: JM/RMB | CHK. BY: RMB

APPROXIMATE CELL DEVELOPMENT/CLOSURE PLAN
(EXISTING - CELL 4-E)

LOWER SAUCON TWP. NORTHAMPTON CO.

PA Bethlehem Landfill Corp.
A Progressive Waste Solutions Company
PENNSYLVANIA

NO.	REVISION	DATE
1	ACCESS ROAD / MSE WALL REDESIGN	6.16

SEAL

Attachment 3

LVPC
Lehigh Valley Planning Commission

LIESEL DREISBACH
Chair

STEPHEN REPASCH
Vice Chair

JOHN DIACOGIANNIS
Treasurer

BECKY A. BRADLEY, AICP
Executive Director

#1162.3

Planning for the Future of Lehigh and Northampton Counties at 961 Marcon Blvd., Ste 310, Allentown, PA 18109 ■ (610) 264-4544 ■ lvpc@lvpc.org ■ www.lvpc.org

January 27, 2016

Mr. John Landis, Chair
Planning Commission
Lower Saucon Township
Town Hall, 3700 Old Philadelphia Pike
Bethlehem, Pennsylvania 18015

Re: IESI PA Bethlehem Landfill Southeastern Realignment
Plans Revised October 12, 2015
Lower Saucon Township
Northampton County

Dear Mr. Landis:

The proposed storm drainage concept presented in the plans revised October 12, 2015, in the storm drainage calculations dated December 2014, and supplemental materials submitted January 13, 2016 and January 27, 2016, has been reviewed for consistency with the *Saucon Creek Watershed Act 167 Storm Water Management Ordinance*, April 1991. The supplemental materials included an electronic version of sheet PC-4 revised January 27, 2016 showing amended grate inlet, emergency spillway and top of berm elevations and revised spillway width for basin 2, plus a revised 100-year routing for basin 2 with the amended design. A checklist of the Act 167 review items is attached for your information. A brief narrative of the review findings is as follows:

> The proposed development is located within drainage district 188 of the Saucon Creek Watershed as delineated in the Act 167 Plan. As such, the runoff control criteria for the site are a 30% Release Rate for the 2-year storm and a 50% Release Rate for the 10-, 25- and 100-year return period storms. Based on review of the plans and calculations, the Drainage Plan controls the post-development flows from basin 2 to values previously found consistent with the Act 167 Ordinance and controls the runoff peak and volume from area A to less than predevelopment levels. Therefore, the Drainage Plan has been found to be consistent with the Act 167 requirements.

Note that only those details of the Drainage Plan included on the checklist have been covered by this review. **Therefore, notable portions of the Drainage Plan not reviewed include any aspect of the post-construction storm water management plan concerning water quality, the details and design of any proposed water quality BMPs, the Erosion and Sedimentation Control Plan and the details of the runoff collection system (piping).** These items are reviewed by the municipal engineer and/or others, as applicable.

Please call me with any questions regarding these comments.

Sincerely yours,

Geoffrey A. Reese, P.E.
Director of Environmental Planning

cc: John Cahalan, Township Manager
Brien Kocher, P.E., Hanover Engineering Associates
Richard Bodner, P.E., Martin & Martin Incorporated
Northampton County Conservation District

LVPC ACT 167 REVIEW CHECKLIST

Development Name: IESI PA Bethlehem Landfill Southeastern Realignment
Municipality: Lower Saucon Township
Date: January 27, 2016

Watershed: Saucon Creek
Reviewer: Geoffrey A. Reese, P.E.
Checked by:

Ordinance Reference	Item	Consistency w/Ordinance Yes	No	N/A	Comment
301.A-G.	General storm water management requirements	X			
H.	Consideration of volume controls		X		Preferred but not required

302.A,B. Applicable Storm Water Management Provisions

Subarea(s)	188			
Criteria	30%/50% RR			

Criteria Key: RR = release rate; PND = provisional no detention

303.A.	Design consistency with applicable management provisions from 302.A. and B	X			
B.	Mapping of Storm Water Management District Boundaries	X			
C.	Downstream capacity analysis			X	
D.	Multiple discharge points within a single subarea			X	
E,F.	Multiple discharge points within multiple subareas			X	
G.	Documentation of "no harm" downstream			X	
H.	Regional or subregional detention analysis			X	
I.	Capacity improvements analysis			X	
304.A.	Computation method (rational or soil-cover-complex)	X			Soil-cover-complex method used.
B.	Verification of detention design by routing	X			
	Check rational method detention volume vs. TR55			X	
C.	Minimum detention pond freeboard specifications	X			
D.	Soil-cover-complex method design rainfall	X			
E.	Rainfall intensities for rational method			X	
F.	Curve Numbers for soil-cover-complex method	X			
G.	Runoff coefficients for the rational method	X			
H.	Manning equation to calculate watercourse capacity			X	
403.	Drainage Plan Contents	X			

Attachment 4

Hanover
Engineering Associates Inc

December 15, 2015

Mr. Jack Cahalan, Manager
Lower Saucon Township
3700 Old Philadelphia Pike
Bethlehem, PA 18015-5426

RE: IESI PA Bethlehem Landfill Corporation
Facility ID 100020
Phase IV and Southeastern Realignment
Land Development Plan
2335 Applebutter Road
Tax Map Parcel P7-5-33
LST Project LD01-2015
Hanover Project LS15-28

Dear Jack:

We have reviewed the submission for the above-referenced project, consisting of a Plan dated August 17, 2015, last revised October 12, 2015, as prepared by Martin and Martin, Inc.

IESI proposes to raise the height of the landfill from Elevation 707 to Elevation 725 (feet above sea level) and expand further to the east.

Public sewage disposal and public water facilities exist and are to be retained, with some modifications proposed in the area of the citizen drop-off area. According to the Zoning Map, the site is located in the Light Industrial (LI) Zone, and only the portion of the property directly along Applebutter Road is identified to be within the Carbonate Geology Overlay District.

We offer the following comments, which are numbered in accordance with the comments in our October 29, 2015 letter, for your consideration:

S

A. GENERAL COMMENTS

ROUTING
- ☒ Council
- ☒ Manager
- ☐ Asst. Mgr.
- ☒ Zoning
- ☐ Finance
- ☐ Police
- ☐ P. Works
- ☒ P/C
- ☐ P & R
- ☒ EAC
- ☐ Engineer
- ☐ Solicitor
- ☐ Planner
- ☒ Landfill
- ☐ EMC
- ☒ Other

1. The changes would allow an increase in total landfill solid waste disposal capacity, for which a Major Permit Modification would be required. The Township Technical Consultant Committee issued review comments on the proposal in a December 14, 2015 letter. Any approval by the Township should be contingent upon approval of the Major Permit Modification.

2. The Plan proposes the construction of a retaining wall along the southern access road that is approximately 65' tall. The design for this retaining wall which is certified by a Professional Engineer must be provided to the Township.

3. The methods of stormwater management provided (to address peak runoff rate) are generally consistent with those of the original approval for this

ZHB

project. However, these methods do not appear to be consistent with the current regulations (governing runoff volume, recharge volume, and water quality).

B. GRADING ORDINANCE COMMENTS

1. Section 77-5 – The work performed would appear to require a permit per this Ordinance. The Applicant shall consult with the Zoning Officer as to whether any separate application is necessary and whether the Land Development Plans submitted may also serve as the Grading/Earth Disturbance Permit Plans.

3. Sections 77-5.E(3)(a)[7], 7.A, J, K, 145-33.E(3), (4), (5) and 48 – See Stormwater and General/Technical Comments.

4. Sections 77-5.E(5) and 137-11.O – The Plans and Stormwater Reports, if revised, must be signed and sealed by the registered professional engineer that prepared them.

7. Sections 77.7.G and 137-23.G – All topsoil stockpiles must be noted to be protected from erosion, and a topsoil stockpile must exist until topsoil is spread over the site. The topsoil stockpile is currently only shown on Sheet ES-1 and ES-2, in a location that is proposed to be disturbed by the proposed expansion to the southeast. The Plans should clarify where topsoil will be stockpiled while this area is being disturbed.

C. STORMWATER MANAGEMENT COMMENTS

1. Sections 137-6.D and 29 – Significant revisions have been made and the Drainage Plan is subject to the provisions of Chapter 137. However, this review letter discusses only those features that have been revised and does not comment on the current Ordinance compliance of existing facilities (swales, pipes, basins) that were previously analyzed for drainage areas that have stayed the same or been reduced in size.

2. Sections 137-11.K and 13.A – The Plan does not propose stormwater runoff volume controls. It has been determined that the site is not subject to infiltration requirements as infiltration is prohibited on Hot Spot Land Uses (per Section 137-15.L), and this development qualifies as a Hot Spot Land Use (per Section 137-15.K(1)) as it is an Industrial Use with an NPDES Permit for industrial stormwater discharge.

7. Section 137-13.R – The materials submitted to obtain the NPDES Permit must be provided and be consistent with the Plans the Township approves.

8. Sections 137-14.B and 26.C(2) – The tributary hydrographs to detention basins and time/elevation/storage volume/release rate tables for each routed hydrograph should be provided.

Attachment 5

LEGEND

- IESI PROPERTY LINE
- EXIST. PERMIT BOUNDARY AS TAKEN FROM MARCH 1994
- STORMWATER POND
- PROPOSED MSE BERM CONSTRUCTION
- 2014 DELINEATED WETLANDS (1.32 AC.) DELINEATED BY ROEMER ECOLOGICAL SERVICES, INC. SURVEY BY BYERS & RUNYON, INC.
- 1991 DELINEATED WETLANDS (3.74 AC.). DELINEATED GANNETT-FLEMING.

WETLAND LOCATION PLAN

SOUTHEASTERN REALIGNMENT — NORTHAMPTON CO.

IESI PA Bethlehem Landfill Corporation

LOWER SAUCON — PENNSYLVANIA

NO | REVISION | DATE | SEAL

MMI martin and martin incorporated
37 south main street • suite A
chambersburg, pennsylvania 17201
phone: (717) 264-8759

CADD FILE: 1162.3-51-08.dwg

DATE: JUNE 2014

SCALE: 1" = 50'

DRAWING NO: 1

Attachment 6

Pennoni

2041 Avenue C
Suite 100
Bethlehem, PA 18017
T: 610-231-0600
F: 610-231-2033

www.pennoni.com

January 11, 2016

Mr. Rick Bodner, P.E.
Martin & Martin, Inc.
37 S. Main Street
Chambersburg, PA 17201

RE: Traffic Impact Evaluation
IESI Bethlehem Landfill Southeastern Realignment

Dear Rick:

In response to your request related to certain traffic comments received from Lower Saucon Township, the following traffic impact evaluation has been completed to determine if the roadway system surrounding the IESI Bethlehem Landfill is adequate to accommodate the additional truck traffic associated with construction and the importation of soil cover and construction materials over the life of the IESI Bethlehem Landfill Southeastern Realignment. As you have confirmed with representatives of the Bethlehem Landfill, although the Realignment project will not increase the Average or Maximum Permitted Daily Tonnage and as such will not increase vehicular trips associated with waste disposal trucks, additional truck traffic associated with construction and the importation of soil cover and construction materials will generally occur on a daily basis over the life of the IESI Bethlehem Landfill Southeastern Realignment. The additional truck traffic associated with construction and soil cover is assumed to begin in 2018 and continue through 2024 (the project's longevity). Attached please find the projected truck documentation provided by the Bethlehem Landfill which shows the projected quarterly truck volume, as well as the projected average volumes per day and per hour.

Project Description

IESI PA Bethlehem Landfill Corporation proposes to extend the life of the existing IESI Bethlehem Landfill by approximately 5.5 years with the Southeastern Realignment project. The IESI Bethlehem Landfill is situated on a tract of land on the northern side of Applebutter Road (SR 2012), east of Shimersville Road (SR 2014), in Lower Saucon Township, Northampton County. The Southeastern Realignment project will provide additional disposal capacity within the current permit limits. However, it will not increase the Average or Maximum Daily Tonnage (currently 1375 tons and 1800 tons respectively). By maintaining the average and maximum tonnage, the vehicle trips associated with waste disposal trucks to and from the site are expected to remain the same. The landfill is currently open and receives waste from 7 AM to 4 PM weekday, 7 AM to noon Saturday and is closed on Sunday. Construction and operations activities, including the importation of soil cover and construction materials, are permitted to occur between 6:00 am and 6:00 pm daily. Only construction and soil cover trucks will travel to and from the landfill from 4:00 PM to 6:00 PM. Access to the site will be provided via the existing full access driveway on Applebutter Road (SR 2012). No new access locations are proposed. The construction and soil cover trucks will travel the same route as the waste disposal trucks and therefore will not impact adjacent roadways outside the original study area and previously studied intersections.

Background

In 2013, an increase in daily tonnage was investigated at the existing IESI Bethlehem Landfill. A traffic impact study was conducted to determine the impact of an increase of the Maximum Daily Tonnage (2200 tons) in the design year of 2025 (10 years from opening according to Chapter 11 of Publication 46). This equated to an additional 29 trips or 15 vehicles (1 vehicle = 2 trips) projected in the AM peak hour and 17 trips or 9 vehicles projected in the PM peak hour. It is important to note that to be conservative, the number of trucks on the

highest day (maximum daily tonnage) was used in the analysis, not the average daily tonnage. This provided a worst case scenario since on other days the truck volumes would be less.

Manual traffic turning movement counts were conducted in 2011 for the weekday AM and weekday PM peak periods between 7:00 AM and 9:00 AM and between 3:00 PM and 6:00 PM and yielded an AM peak hour beginning at 7:15 AM and a PM peak hour beginning at 5:00 PM at all study intersections, except at the site driveway. At the site driveway on Applebutter Road, the AM peak hour begins at 7:00 AM and the PM peak hour begins at 2:45 PM. Please note that the PM peak hour of the roadway network occurred after the landfill was closed. A growth rate of 1.57% (Growth Factors for September 2012 to July 2013), compounded for 4 years and 14 years was used to calculate future traffic for the opening (2015) and design year (2025). Two other developments, Majestic and LVIP VII, were also included in the analysis. Majestic was anticipated to be at full capacity in 2025 and LVIP VII was anticipated to be at 90% capacity in 2025. If the sites develop at a slower rate than anticipated, there would be additional capacity on the study roadways. Roadway improvements to widen SR 0412 from the I-78 Ramp intersections through the Shimersville Road (SR 2014) intersection have recently been completed by PennDOT.

The results of this study showed that the additional traffic from the previously investigated tonnage increase could be accommodated without intersection level of service drops at each study intersection with the exception of Applebutter Road (SR 2012) and Shimmersville Road (SR 2014) where the overall level of service was projected to drop from a LOS D to a LOS F during the 2025 PM peak hour analysis. It was determined that the only way to mitigate the deficient levels of service would be to signalize this intersection; however, the minor street (Applebutter Road) traffic volumes were too low to satisfy signal warrants for the 2015 or the 2025 analyses. A roundabout was also considered for this intersection however there are constructability issues associated with the geographic constraints of the nearby stream. It is important to note that this LOS drop was almost exclusively attributed to the additional traffic of nearby developments and occurred during the PM peak commuter hour between the hours of 5:00 – 6:00 PM when the landfill is closed to waste disposal trucks.

The total existing AM and PM Peak Hour IESI Bethlehem Landfill trips associated with waste disposal trucks were compared to the total AM and PM Peak Hour Majestic and LVIP VII generated trips and indicated that the Bethlehem Landfill trips account for less than 1% of the traffic expected to be generated by the proposed developments in the vicinity. The anticipated deficiencies determined in the design year 2025 are not due to the extension of the IESI Bethlehem Landfill; rather, they are a result of the substantial nearby developments, Majestic and LVIP VII, which are under construction.

Evaluation

Although the Southeastern Realignment of the landfill will not increase the Average or Maximum Permitted Daily Tonnage and as such will not increase vehicular trips associated with waste disposal trucks, additional truck traffic associated with construction and the importation of soil cover and construction materials will occur on a daily basis over the life of the IESI Bethlehem Landfill Southeastern Realignment project. The attached projected truck documentation provided by the Bethlehem Landfill indicates that the worst case total number of new trips per hour is 12 trips or 6 vehicles (3 months in the summer of 2020). This assumes an even distribution of trips throughout the 12 hour day. The average projected number of new trips per hour over the 7 years is 6 trips or 3 vehicles. It can be seen that the worst case trips associated with construction and the importation of soil cover and construction materials are less (average trips are substantially less) than the previously anticipated additional trips associated with waste disposal trucks when an increase in daily tonnage was investigated in the original study. In addition to the trips being less, the current growth rate provided by PennDOT for an urban, non-interstate roadway is 1.42% ("Growth Factors for August 2015 to July 2016") which is less than what was used in the original study. Also, the projected life of the IESI Bethlehem Landfill Southeastern Realignment will expire

in 2024 rather than 2025 used in the original study. This will reduce the design year volumes and as a result, reduce the impact on the surrounding network from the impacts found in the original study. Furthermore, the impacts of the original study will only be realized if Majestic is operating at full capacity and LVIP VII is operating at 90% capacity in 2025.

Conclusion

Without conducting new manual turning movement counts at the study intersections and updating the traffic impact study, it can be seen that the additional truck traffic (an average of 6 trips or 3 vehicles per hour) associated with construction and the importation of soil cover and construction materials over the 7 years will have little to no impact on the traffic route and study intersections during the AM and PM peak hour periods. The volume of traffic generated by the Bethlehem Landfill is negligible to the roadway system with an average of 1 trip every 10 minutes during the AM and PM peak hours. This minor volume of traffic could be experienced on a specific day as a result of fluctuation in one of the many warehouses proposed with the nearby developments with or without the landfill. The worst impact, 12 trips or 6 vehicles per hour, will only occur over a 3-month period during the summer months of 2020.

The Southeastern Realignment is projected to span the period from 2018 and into 2024 at the permitted daily waste volumes. As currently planned, the landfill will no longer be in operation after 2024. If the associated site life extends beyond this period, then the volumes of waste actually received would be less than the designed volumes, and the traffic impacts would likewise have been reduced.

If you have any questions or would like to discuss our evaluation in more detail, please do not hesitate to contact me.

Sincerely,

PENNONI ASSOCIATES INC.

Earl W. Armitage III

Earl Armitage III, P.E.
Senior Traffic Engineer

BETHLEHEM LANDFILL
SOUTHEASTERN REALIGNMENT
PROJECTED TRUCK COUNT - IMPORTATION OF CONSTRUCTION AND SOIL MATERIALS

DAYS / WEEK TRUCKS RUN	6	Mon-Sat
DAYS / QUARTER TRUCKS RUN	78	
HOURS / DAY TRUCKS RUN	12	6AM-6PM

YEAR	QUARTER	# OF TRUCKS	# OF TRUCKS / DAY	(12 hour day) # OF TRUCKS / HOUR	TOTAL # OF TRIPS / HOUR
2018	1ST	1,948	25	2	4
	2ND	3,731	48	4	8
	3RD	3,002	38	3	6
	4TH	1,948	25	2	4
2019	1ST	1,794	23	2	4
	2ND	2,126	27	2	5
	3RD	4,205	54	4	9
	4TH	4,455	57	5	9
2020	1ST	3,987	51	4	8
	2ND	3,987	51	4	8
	3RD	5,809	74	6	12
	4TH	2,027	26	2	4
2021	1ST	1,334	17	1	3
	2ND	1,636	21	2	3
	3RD	3,091	40	3	7
	4TH	2,186	28	2	5
2022	1ST	4,255	54	5	9
	2ND	3,478	44	4	7
	3RD	2,339	30	2	5
	4TH	1,908	24	2	4
2023	1ST	1,334	17	1	3
	2ND	1,334	17	1	3
	3RD	2,967	38	3	6
	4TH	2,967	38	3	6
2024	1ST	0	0	0	0
	2ND	0	0	0	0
	3RD	1,544	20	2	3
	4TH	1,544	20	2	3
			averages	3	6

Attachment 7

Pennoni

2041 Avenue C
Suite 100
Bethlehem, PA 18017
T: 610-231-0600
F: 610-231-2033

www.pennoni.com

July 30, 2016

MMTN 1101

Rick Bodner

RE: IESI Bethlehem Landfill Expansion: Lower Saucon Township June 15, 2016 Condition of Approval

Dear Mr. Bodner,

We offer the following response to the Lower Saucon Township June 15, 2016 condition of approval:

General

A. **IESI shall review available accident history for Applebutter Road to identify crash patterns attributable to truck traffic, and evaluate the adequacy of roadway signage on Applebutter Road for additional truck traffic generated by the Southeastern Realignment, particularly advance warning signs for roadway curvatures.**

After reviewing the available crash data, there does not appear to be any crash patterns attributable to truck traffic, particularly truck traffic associated with landfill activity along Applebutter Road (SR 2012) within the study area in Lower Saucon Township and the City of Bethlehem. A summary of the crash data is attached with this response.

In 2011-2012, PennDOT improved the signage along Applebutter Road, such that the existing signage is consistent with PennDOT standards, including advance warning signs for roadway curvatures. Nevertheless, Pennoni conducted a field view of Applebutter Road (SR 2012) on February 2, 2016 to verify the type of warning signs and their location in addition to the pavement markings along the corridor. Table 1.A identifies the type of sign and its position along Applebutter Road (SR 2012).

As can be seen in the table, there are many warning signs located along this section of Applebutter Road (SR 2012) including curve warning signs, advisory speed signs, and chevrons. In addition to the signage, there is a double yellow centerline, white edgelines, and SLOW/ARROW pavement markings at key locations. PennDOT has also installed centerline rumble strips along Applebutter Road (SR 2012) to assist motorists traveling the roadway.

While the vast majority of the signs are properly located, we offer the following suggestions to improve signing on the roadway. It should be noted that the field view of Applebutter Road (SR 2012) extended beyond the Lower Saucon Township boundaries into the City of Bethlehem. The suggestions noted in SR 2012 SEG 0010 below are located in the City of Bethlehem and the suggestions noted in SR 2012 SEG 0030 below are located in Lower Saucon Township.

- The existing Stop Ahead (W3-1) sign could be relocated east on Applebutter Road (SR 2012) so that it is a minimum 250ft from the intersection of Shimersville Road (SR 2014) near SR 2012

SEG 0010 OFF 250 to provide adequate advance warning of the stop sign in accordance with Pub 236.

- Additional Chevron Alignment (W1-8) signs could be installed on the sharp turn on Applebutter Road (SR 2012) near SR 2012 SEG 0010 OFF 1000 in accordance with the MUTCD Figure 2C-2 to supplement the Large Single Arrow (W1-6) signs.
- A Slow Curve Arrow could be painted in the eastbound lane of Applebutter Road (SR 2012) in advance of the sharp turn at approximately SR 2012 SEG 0010 OFF 2000 in accordance with Pub 111 Pavement Marking Standards TC-8600.
- A Right Clearance Marker (OM-3R) could be placed in the westbound shoulder on Applebutter Road (SR 2012) near the pipe culvert crossing at SR 2012 SEG 0030 OFF 1580.

These suggestions related to signage and pavement markings should be review and approved by PennDOT's traffic unit before any changes are made.

If you have any questions or comments, or require additional information, please do not hesitate to contact me.

Sincerely,

PENNONI ASSOCIATES INC.

Earl W. Armitage III

Earl W. Armitage III, P.E.
Transportation Division Manager

Enclosures

L:\PROJECTS\MMTN\MMTN1101 - IESI PA Bethlehem Landfill Traffic Impact Study\SUBMISSIONS\2016-07-30 - Submission

Pennoni

CRASH ANALYSIS

IESI Bethlehem Landfill SE Realignment

Applebutter Road (SR 2012)
Lower Saucon Township
Northampton County, PA

Prepared For:

IESI PA Bethlehem Landfill Corporation
2335 Applebutter Road
Bethlehem, PA 18015
(610) 317- 3200

Prepared By:

Pennoni Associates Inc.
2041 Avenue C,
Suite 100
Bethlehem, PA 18017
(610) 231 - 0600

July, 2016

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
WENDY C. KELLEY
ENGINEER
PE075354

7-28-16

Wendy C. Kelley

Wendy Kelley, P.E.
PENNSYLVANIA P.E. PE075354

MMTN1101

CRASH HISTORY

This analysis has been prepared in response to the June 15, 2016 Lower Saucon Township condition of approval with regard to the review of available accident history for Applebutter Road to identify crash patterns attributable to truck traffic, and evaluation of the adequacy of roadway signage on Applebutter Road for additional truck traffic generated by the IESI Bethlehem Landfill Southeastern Realignment, particularly advance warning signs for roadway curvatures. After reviewing the available crash data, there does not appear to be any crash patterns attributable to truck traffic, particularly truck traffic associated with landfill activity, for the approach route to/from the landfill.

Reportable crash data for the last five years (2010 through 2014) for Applebutter Road (SR 2012) in the study area, as well as at the intersection of Applebutter Road (SR 2012) and the Site Driveway were obtained from PENNDOT. The study area is comprised of Applebutter Road (SR 2012), Segment 0010 in its entirety, Segment 0020 in its entirety, and Segment 0030 from Offset 0000 to 1835. The Site Driveway is located at Segment 0030, Offset 1835. Segment 0010 in its entirety is located in the City of Bethlehem. Segment 0020 in its entirety, Segment 0030 from Offset 0000 to 1835, and the Site Driveway is located in Lower Saucon Township. See **Figure 1 & 2.**

Non-reportable crash data were requested from Lower Saucon Township for the same time period in the study area, as well as at the intersection of Applebutter Road (SR 2012) and the Site Driveway. However, the three (3) non-reportable crash reports obtained from Lower Saucon Township were already included in the reportable crash data received from PennDOT. Non-reportable crash data were requested from the City of Bethlehem for the same time period in the study area as well; however, we did not meet the requirements to obtain non-reportable crash data from the City of Bethlehem in accordance with 75 Pa. C.S. Sec. 3751(b)(1). A copy of the PennDOT e-mail and reportable crash data is attached in the Appendix.

No crashes were found at the intersection of Applebutter Road (SR 2012) and the Site Driveway.

The crash rates and fatality crash rates (per million vehicle miles traveled) for each roadway segment of SR 2012 within the study area within Lower Saucon Township and the City of Bethlehem were included on the crash reports provided by PENNDOT. The crash rates were then compared to the "Homogeneous Report for State Road Crashes in Years 2010 to 2014," which lists the average crash rates for various roadway types. The PENNDOT crash reports also list the homogeneous rates (5-year) for each segment, as well as the "delta," which is calculated as the Crash Rate / Homogeneous Rate, and is an indicator of how the actual crash rate compares to the statewide average for roadway segments or intersections with similar characteristics. These crash rates are summarized in **Table 1** below, and the PENNDOT crash reports and Statewide Crash Reports are attached in the Appendix.

It should be noted that 2015 crash data is now available and revealed that one additional crash occurred at Segment 0020, Offset 0931 under slippery snow covered road conditions and involved a westbound van traveling too fast for conditions on a straight section of the roadway and caused a rear-end collision with an automobile at approximately 1 AM in the morning on 3/6/2016. The previous crash assessment was not adjusted as this new data does not grossly impact the findings and conclusions. In addition, the previous assessment yields a worst case scenario as the 2010-2014 data yields 11 crashes in the study area and the 2011-2015 data yields 7 crashes and lower crash rates in the study area.

FIGURE 1 – Lower Saucon Township

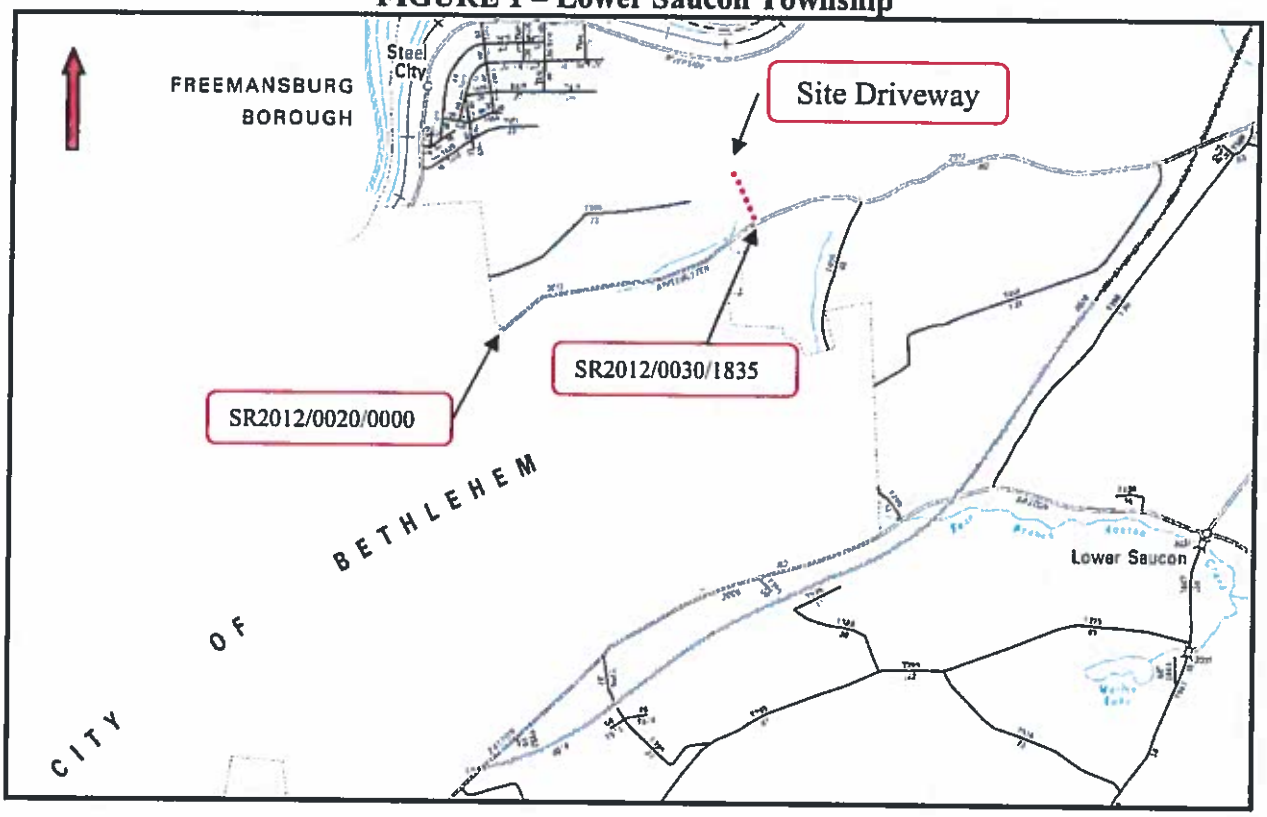


FIGURE 2 – City of Bethlehem

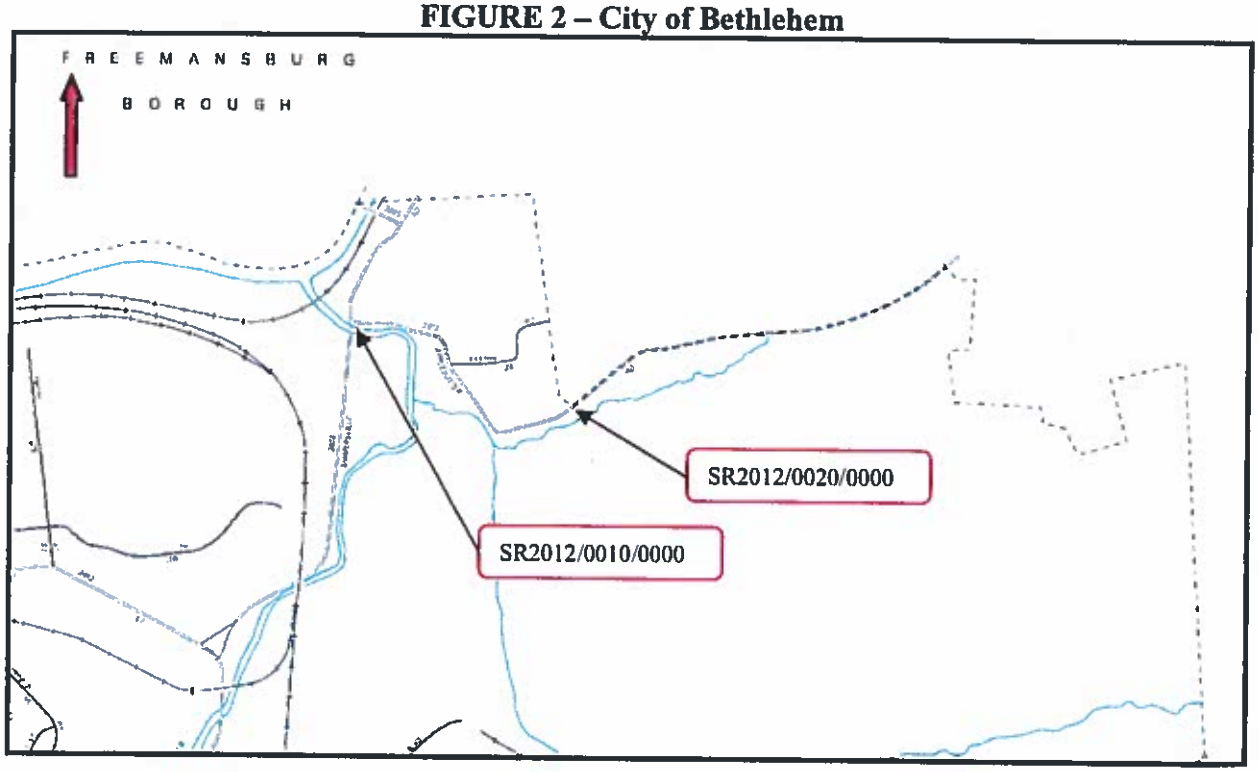


TABLE 1
CRASH RATES

Roadway/Intersection	Jurisdiction	Segment	# of Crashes	Crash Rate	Homogenous Rate	Delta
SR 2012 (Applebutter Rd.)	City of Bethlehem	0010	7	13.22	1.52	8.70
SR 2012 (Applebutter Rd.)	L. Saucon Township	0020	4	3.06	1.52	2.02
SR 2012 (Applebutter Rd.) (near site driveway)	L. Saucon Township	0030	2	1.6	1.52	1.05

There were no fatalities along the segments and offsets mentioned above.

The crash rate along Segment 0010 of Applebutter Road (SR 2012) is 13.22, which is 8.70 times the statewide average of 1.52 for this roadway type. There appears to be a collision type pattern along this Segment of Roadway located in the City of Bethlehem involving motorists traveling too fast for conditions while negotiating the curves and hitting fixed objects under wet road conditions. Two (2) of the (7) crashes involved small trucks; however, these crashes occurred at 10:58 AM on a Sunday and at 5:45 PM on a Friday. This would suggest that the trucks were not affiliated with the Bethlehem Landfill since the crashes occurred outside of the Landfill operating hours of 7AM to 4 PM Monday thru Friday and 7AM to noon on Saturday. See **Figure 3** for a crash diagram.

The crash rate along Segment 0020 of Applebutter Road (SR 2012) is 3.06, which is 2.02 times the statewide average of 1.52 for this roadway type; however, the number of crashes (4) is low. No collision type pattern exists, however, crashes were caused predominantly by eastbound motorists (3 of 4) along a straight section of roadway within a few hundred feet of each other during day lit, dry conditions. Two (2) of the (4) crashes involved small trucks; however, these crashes occurred at 6:38 PM on a Saturday and at 8:10 PM on a Tuesday. This would suggest that the trucks were not affiliated with the Bethlehem Landfill since the crashes occurred outside of the Landfill operating hours of 7AM to 4 PM Monday thru Friday and 7AM to noon on Saturday. See **Figure 3** for a crash diagram.

The 2 crashes that occurred along Segment 0030 of Applebutter Road (SR 2012) were outside of our study area, east of the Site Driveway. All trips and truck traffic associated with the Bethlehem Landfill travel to and from the site via the west.

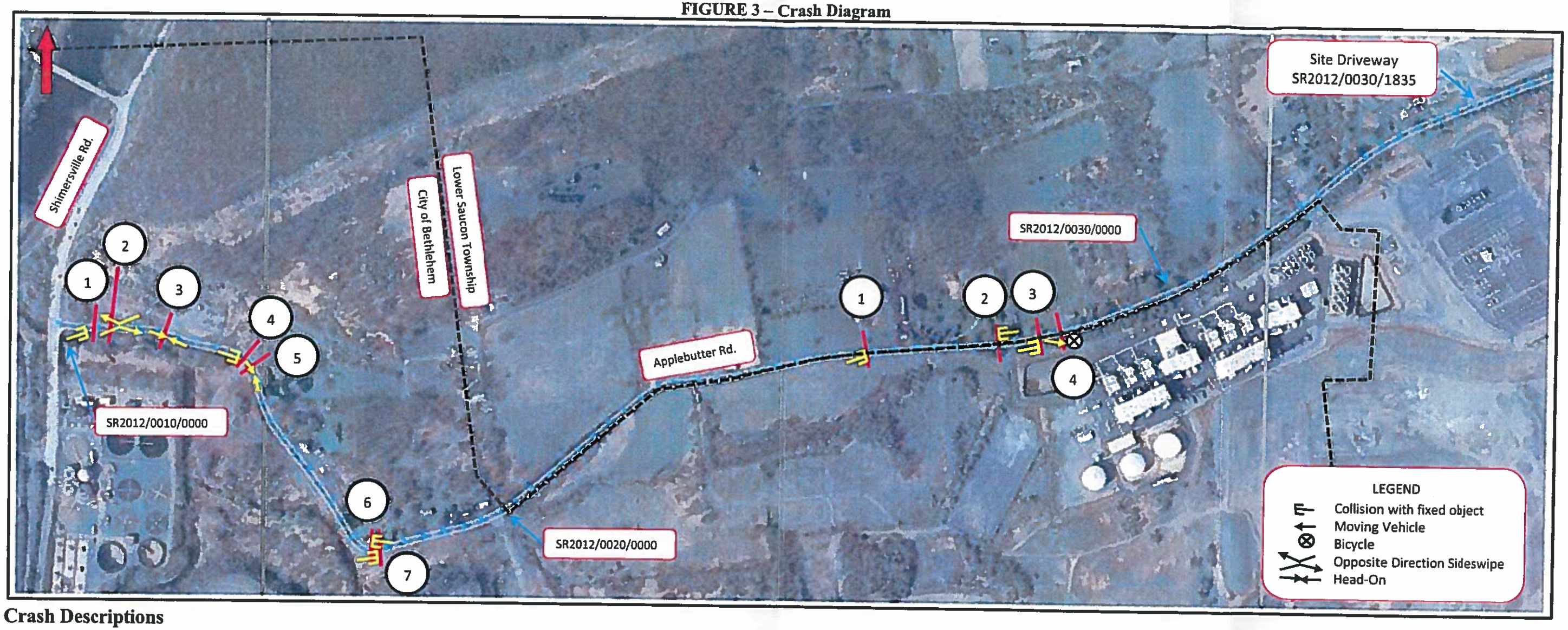
CONCLUSION

The calculated crash rate along Applebutter Road (SR 2012), Segment 0010 is higher than the state wide average rates for similar roadways as noted above and there does appear to be a collision type pattern along this Segment of Roadway located in the City of Bethlehem involving motorists traveling too fast for conditions while negotiating the curves and hitting fixed objects under wet road conditions.

While the calculated crash rates along Applebutter Road (SR 2012), Segments 0020 & 0030, are higher than the state wide average rates for similar roadways as noted above, the number of crashes are low and are not associated with Landfill traffic. No crashes were found at the intersection of Applebutter Road (SR 2012) and the Site Driveway.

Accordingly, a roadway signage evaluation was performed along Segments 0010, 0020, and 0030 of Applebutter Road (SR 2012) to assess existing warning sign conditions and offer suggestions on improving safety.

FIGURE 3 – Crash Diagram



Crash Descriptions

City of Bethlehem –SR2012 / SEG 0010

1. March 2014, Friday, 3:27PM. Eastbound car speeding and over/under compensated curve while negotiating the curve hit fixed object (other) under wet road conditions.
2. May 2011, Saturday, 5:44PM. Westbound car made improper/careless turn into oncoming traffic lane while negotiating the curve and sideswiped eastbound car under wet road conditions.
3. April 2014, Wednesday, 12:46PM. Eastbound car traveling too fast for conditions over/under compensated curve while negotiating the curve hit westbound SUV head-on under wet road conditions.
4. November 2010, Friday, 10:11AM. Eastbound car traveling too fast for conditions while negotiating the curve hit fixed object (fence or wall) under wet road conditions.
5. August 2013, Monday, 7:40AM. Eastbound car traveling too fast for conditions over/under compensated curve while negotiating the curve hit westbound car head-on under wet road conditions.
6. April 2010, Sunday, 10:58AM. Westbound small truck speeding while negotiating the curve hit fixed object (utility pole) under wet road conditions.
7. May 2010, Friday, 5:45PM. Eastbound small truck with inexperienced driver traveling too fast for conditions while negotiating the curve hit fixed object (utility pole) under wet road conditions.

Lower Saucon Township – SR2012 / SEG 0020 & SR 2012 / SEG 0030

1. August 2010, Saturday, 6:38PM. Eastbound small truck acted improperly and driving on the wrong side of road while traveling straight hit fixed object (ditch) under dry road conditions.
2. May 2010, Sunday, 5:59PM. Westbound car speeding while traveling straight hit fixed object (guiderail / culvert) under dry road conditions.
3. August 2014, Monday, 7:46PM. Eastbound car with inexperienced distracted driver while traveling straight hit fixed object (utility pole) under dry road conditions.
4. August 2012, Tuesday, 8:10PM. Eastbound small truck over/under compensated curve while negotiating the curve hit bicycle traveling east under dry road conditions.

APPENDIX

Northampton County: portion of State Route 2012 (for Pennoni)

Date Range: 1/1/2010 to 12/31/2014

Area of Interest: (In County 48 On State Route 2012(P) Between Segment 0010 Offset 0 and Segment 0030 Offset 1835)

USER ID/QUERY ID: coswald/ 0520160204007

MONTH OF YEAR

	JAN	MAR	APR	MAY	JUN	AUG	SEP	OCT	NOV	
CRASHES	1	1	3	3	1	5	1	1	2	18
PCT	6%	6%	17%	17%	6%	28%	6%	6%	11%	100%

DAY OF WEEK

	SUN	MON	TUE	WED	THR	FRI	SAT	
CRASHES	3	2	2	3	2	4	2	18
PCT	17%	11%	11%	17%	11%	22%	11%	100%

HOUR OF DAY

	03	07	09	10	12	14	15	17	18	19	20	
CRASHES	1	2	2	2	1	1	1	4	2	1	1	18
PCT	6%	11%	11%	11%	6%	6%	6%	22%	11%	6%	6%	100%

YEAR

	CRASHES	PCT
2010	5	28%
2011	3	17%
2012	3	17%
2013	2	11%
2014	5	28%
TOTAL	18	100%

COLLISION TYPE

	CRASHES	PCT
HIT FIX OBJ	8	44%
ANGLE	6	33%
HEAD ON	2	11%
OPP DIR SS	1	6%
SAME DIR SS	1	6%
TOTAL	18	100%

CRASH SEVERITY LEVEL

	CRASHES	PCT
MAJOR	1	6%
MINOR	6	33%
UNK SEVERITY	6	33%
UNK IF INJURED	1	6%
PDO	4	22%
TOTAL	18	100%

SEVERITY COUNT

	PERSONS
FATALITIES	0
MAJOR	1
MODERATE	0
MINOR	6
UNK SEVERITY	10
UNK IF INJURED	1

DRIVER ACTIONS

	ACTIONS	PCT
NO CONTRIBUTING ACTION	11	27%
TOO FAST FOR CONDITION	6	15%
OVER/UNDER COMP CURVE	4	10%
DRIVER INEXPERIENCED	3	7%
IMPROPER/CARELESS TURN	3	7%
PROCEED W/O CLEARANCE	3	7%
SPEEDING	3	7%
OTHER IMPROPER DRIVING	2	5%
UNKNOWN	2	5%
DRIVER WAS DISTRACTED	1	2%
FAILURE TO RESPOND TCD	1	2%
RUNNING STOP SIGN	1	2%
OTHERS	1	2%
TOTAL	41	100%

VEHICLE TYPE

	VEHICLES	PCT
AUTOMOBILE	19	66%
SMALL TRUCK	5	17%
SUV	3	10%
BUS	1	3%
PEDALCYCLE	1	3%
TOTAL	29	100%

ROAD CONDITION

	CRASHES	PCT
DRY	10	56%
WET	8	44%
TOTAL	18	100%

ILLUMINATION

	CRASHES	PCT
DAYLIGHT	16	89%
DUSK	1	6%
STREET LIGHTS	1	6%
TOTAL	18	100%

WEATHER

	CRASHES	PCT
CLEAR	11	61%
RAIN	7	39%
TOTAL	18	100%

ENVIR/ROADWAY FACTORS

	FACTORS	PCT
NONE	13	68%
OTHER WEATHER COND	2	11%
GLARE	1	5%
OTHER ENVIR FACTOR	1	5%
OTHER RDWY FACTOR	1	5%
WORK ZONE RELATED	1	5%
TOTAL	19	100%

CDART - CRASH SUMMARY REPORT (09-06)

NOTES:

1

The data available in this application is dynamic and should be used with care. Please take note of the following data alerts:

2 2015 crash records are incomplete
Data for the current year, 2015, is not fully represented in CDART. Crashes will be added for this year as they are made available to the Department. Include this year in queries with caution.

3 Complete data years
Complete records of reportable crashes are available in CDART for the following years: 1997 - 2014

REPORT PARAMETERS:

Query ID:	0520160204007
User ID:	coswald
Area of Interest:	(In County 48 On State Route 2012(P) Between Segment 0010 Offset 0 and Segment 0030 Offset 1835)
Date Range:	1/1/2010 to 12/31/2014
Criteria:	STATE ROAD

Northampton County: portion of State Route 2012 (for Pennoni)

Sorted by County, Route, Segment, Offset

Date Range: 1/1/2010 to 12/31/2014

USER ID/QUERY ID:
coswald/ 0520160204007

Area of Interest: (In County 48 On State Route 2012(P) Between Segment 0010 Offset 0 and Segment 0030 Offset 1835)

	CRN	CO	DATE	DAY	TIME	LIGHTING	ROAD SURF	WEATHER	FAT	INJ	PED	VEH	MAX SEVERITY
1	2011108998	48	10/12/2011	WED	03:36	STREET LT	DRY	CLEAR	0	1	0	2	MINOR INJURY

ENV RDWY FACTORS: NONE
Y-INT 2012/0010/0000 2014/0030/0421 2014/0031/0427
SAME DIR SIDESW

VEH: 1 SUV TRAVELING NORTH IN RIGHT LANE GOING STRAIGHT
VEH EVENTS: STRUCK BY UNIT 02
DVR ACTIONS: PROCEED W/O CLEARANCE

VEH: 2 AUTOMOBILE TRAVELING NORTH IN RIGHT LANE GOING STRAIGHT
VEH EVENTS: HIT UNIT 01
DVR ACTIONS: NO CONTRIBUTING ACTION

2	2011121261	48	11/23/2011	WED	09:05	DAYLIGHT	WET	RAIN	0	2	0	2	UNK SEVERITY

ENV RDWY FACTORS: WORK ZONE RELATED
T-INT 2012/0010/0000 2014/0030/0421 2014/0031/0427
ANGLE

VEH: 1 AUTOMOBILE TRAVELING WEST IN RIGHT LANE TURNING LEFT
VEH EVENTS: HIT UNIT 02
DVR ACTIONS: PROCEED W/O CLEARANCE
ALC TEST: 99

VEH: 2 AUTOMOBILE TRAVELING NORTH IN RIGHT LANE GOING STRAIGHT
VEH EVENTS: STRUCK BY UNIT 01
DVR ACTIONS: NO CONTRIBUTING ACTION

3	2012034366	48	04/03/2012	TUE	18:08	DAYLIGHT	DRY	CLEAR	0	1	0	3	MINOR INJURY

ENV RDWY FACTORS: NONE
T-INT 2012/0010/0000 2014/0030/0421 2014/0031/0427
ANGLE

VEH: 1 AUTOMOBILE TRAVELING SOUTH IN RIGHT LANE TURNING LEFT
VEH EVENTS: HIT UNIT 02
DVR ACTIONS: IMPROPER/CARELESS TURN

VEH: 2 AUTOMOBILE TRAVELING NORTH IN RIGHT LANE GOING STRAIGHT
VEH EVENTS: STRUCK BY UNIT 01 HIT UNIT 03
DVR ACTIONS: NO CONTRIBUTING ACTION

VEH: 3 AUTOMOBILE TRAVELING WEST IN RIGHT LANE STOPPED IN TRAFFIC LANE
VEH EVENTS: STRUCK BY UNIT 02
DVR ACTIONS: NO CONTRIBUTING ACTION

4	2012058022	48	06/10/2012	SUN	17:08	DAYLIGHT	DRY	CLEAR	0	1	0	2	UNK SEVERITY

ENV RDWY FACTORS: NONE
T-INT 2012/0010/0000 2014/0030/0421 2014/0031/0427
ANGLE

VEH: 1 AUTOMOBILE TRAVELING WEST IN RIGHT LANE GOING STRAIGHT
VEH EVENTS: STRUCK BY UNIT 02
DVR ACTIONS: RUNNING STOP SIGN

VEH: 2 AUTOMOBILE TRAVELING NORTH IN RIGHT LANE GOING STRAIGHT
VEH EVENTS: HIT UNIT 01
DVR ACTIONS: NO CONTRIBUTING ACTION

5	2013083316	48	08/16/2013	FRI	09:34	DAYLIGHT	DRY	CLEAR	0	1	0	1	MAJOR INJURY

ENV RDWY FACTORS: NONE
T-INT 2012/0010/0000 2014/0030/0421 2014/0031/0427
HIT FIXED OBJ

VEH: 1 AUTOMOBILE TRAVELING SOUTH IN RIGHT LANE GOING STRAIGHT
VEH EVENTS: HIT GUARD / GUIDE RAIL HIT BRIDGE PIER OR ABUTMENT
DVR ACTIONS: UNKNOWN
ALC TEST: 99

	CRN	CO	DATE	DAY	TIME	LIGHTING	ROAD SURF	WEATHER	FAT	INJ	PED	VEH	MAX SEVERITY
6	2014013003	48	01/30/2014	THR	14:52	DAYLIGHT	DRY	CLEAR	0	0	0	2	PROP DMG ONLY
	ENV RDWY FACTORS: GLARE												ANGLE
	T-INT 2012/0010/0000 2014/0030/0421 2014/0031/0427												
	VEH: 1 AUTOMOBILE TRAVELING WEST IN LEFT LANE TURNING LEFT												
	VEH EVENTS: HIT UNIT 02												
	DVR ACTIONS: IMPROPER/CARELESS TURN												
	VEH: 2 SUV TRAVELING EAST IN RIGHT LANE GOING STRAIGHT												
	VEH EVENTS: STRUCK BY UNIT 01												
	DVR ACTIONS: NO CONTRIBUTING ACTION												
7	2014091707	48	09/18/2014	THR	07:40	DAYLIGHT	DRY	CLEAR	0	1	0	2	MINOR INJURY
	ENV RDWY FACTORS: NONE												ANGLE
	T-INT 2012/0010/0000 2014/0030/0421 2014/0031/0427												
	VEH: 1 SMALL TRUCK TRAVELING WEST IN LEFT TURN LANE TURNING LEFT												
	VEH EVENTS: STRUCK BY UNIT 02												
	DVR ACTIONS: PROCEED W/O CLEARANCE												
	VEH: 2 BUS TRAVELING NORTH IN RIGHT LANE GOING STRAIGHT												
	VEH EVENTS: HIT UNIT 01												
	DVR ACTIONS: NO CONTRIBUTING ACTION												
8	2014034846	48	03/28/2014	FRI	15:27	DAYLIGHT	WET	RAIN	0	2	0	1	UNK SEVERITY
	ENV RDWY FACTORS: OTHER WEATHER CONDITIONS OTHER ROADWAY FACTOR												HIT FIXED OBJ
	MIDB 2012/0010/0182												
	VEH: 1 AUTOMOBILE TRAVELING EAST IN RIGHT LANE NEGOTIATING CURVE - RIGHT												
	VEH EVENTS: HIT OTHER FIXED OBJECT OVERTURN/ROLL OVER												
	DVR ACTIONS: SPEEDING TOO FAST FOR CONDITIONS OVER/UNDER COMPENSATE CURVE												
9	2011058101	48	05/07/2011	SAT	17:44	DAYLIGHT	WET	RAIN	0	2	0	2	UNK SEVERITY
	ENV RDWY FACTORS: NONE												OPP DIR SIDESW
	MIDB 2012/0010/0246												
	VEH: 1 AUTOMOBILE TRAVELING WEST IN ONCOMING TRAFFIC LANE NEGOTIATING CURVE - RIGHT												
	VEH EVENTS: HIT UNIT 02												
	DVR ACTIONS: IMPROPER/CARELESS TURN												
	VEH: 2 AUTOMOBILE TRAVELING EAST IN RIGHT LANE NEGOTIATING CURVE - LEFT												
	VEH EVENTS: STRUCK BY UNIT 01												
	DVR ACTIONS: NO CONTRIBUTING ACTION												
10	2014045233	48	04/30/2014	WED	12:46	DAYLIGHT	WET	RAIN	0	1	0	2	MINOR INJURY
	ENV RDWY FACTORS: OTHER ENVIRONMENTAL FACTOR												HEAD-ON
	MIDB 2012/0010/0531												
	VEH: 1 AUTOMOBILE TRAVELING EAST IN RIGHT LANE NEGOTIATING CURVE - RIGHT												
	VEH EVENTS: HIT UNIT 02												
	DVR ACTIONS: TOO FAST FOR CONDITIONS OVER/UNDER COMPENSATE CURVE												
	VEH: 2 SUV TRAVELING WEST IN RIGHT LANE NEGOTIATING CURVE - LEFT												
	VEH EVENTS: STRUCK BY UNIT 01												
	DVR ACTIONS: NO CONTRIBUTING ACTION												
11	2010123959	48	11/26/2010	FRI	10:11	DAYLIGHT	WET	CLEAR	0	0	0	1	PROP DMG ONLY
	ENV RDWY FACTORS: NONE												HIT FIXED OBJ
	MIDB 2012/0010/0961												
	VEH: 1 AUTOMOBILE TRAVELING EAST IN RIGHT LANE NEGOTIATING CURVE - RIGHT												
	VEH EVENTS: HIT FENCE OR WALL												
	DVR ACTIONS: TOO FAST FOR CONDITIONS												

	CRN	CO	DATE	DAY	TIME	LIGHTING	ROAD SURF	WEATHER	FAT	INJ	PED	VEH	MAX SEVERITY
12	2013081130	48	08/12/2013	MON	07:40	DAYLIGHT	WET	RAIN	0	0	0	2	PROP DMG ONLY
	ENV RDWY FACTORS: OTHER WEATHER CONDITIONS												HEAD-ON
	MIDB 2012/0010/1012												
	VEH: 1 AUTOMOBILE TRAVELING EAST IN RIGHT LANE NEGOTIATING CURVE - RIGHT												
	VEH EVENTS: HIT UNIT 02												
	DVR ACTIONS: TOO FAST FOR CONDITIONS OVER/UNDER COMPENSATE CURVE												
	VEH: 2 AUTOMOBILE TRAVELING WEST IN RIGHT LANE GOING STRAIGHT												
	VEH EVENTS: STRUCK BY UNIT 01 HIT OTHER FIXED OBJECT												
	DVR ACTIONS: NO CONTRIBUTING ACTION												
13	2010040031	48	04/25/2010	SUN	10:58	DAYLIGHT	WET	RAIN	0	1	0	1	MINOR INJURY
	ENV RDWY FACTORS: NONE												HIT FIXED OBJ
	MIDB 2012/0010/2126												
	VEH: 1 SMALL TRUCK TRAVELING WEST IN RIGHT LANE NEGOTIATING CURVE - RIGHT												
	VEH EVENTS: HIT UTILITY POLE												
	DVR ACTIONS: SPEEDING FAILURE TO RESPOND TO TCD												
14	2010046916	48	05/14/2010	FRI	17:45	DAYLIGHT	WET	RAIN	0	0	0	1	PROP DMG ONLY
	ENV RDWY FACTORS: NONE												HIT FIXED OBJ
	MIDB 2012/0010/2155												
	VEH: 1 SMALL TRUCK TRAVELING EAST IN RIGHT LANE NEGOTIATING CURVE - LEFT												
	VEH EVENTS: HIT UTILITY POLE												
	DVR ACTIONS: TOO FAST FOR CONDITIONS DRIVER INEXPERIENCED												
15	2010083998	48	08/21/2010	SAT	18:38	DAYLIGHT	DRY	CLEAR	0	0	0	1	UNK IF INJURED
	ENV RDWY FACTORS: NONE												HIT FIXED OBJ
	MIDB 2012/0020/1988												
	VEH: 1 SMALL TRUCK TRAVELING EAST IN LEFT OF TRAFFICWAY UNKNOWN												
	VEH EVENTS: HIT DITCH												
	DVR ACTIONS: DRIVING WRONG SIDE OF ROAD OTHER IMPROPER DRIV ACTIONS UNKNOWN												
16	2010047657	48	05/02/2010	SUN	17:59	DAYLIGHT	DRY	CLEAR	0	2	0	1	UNK SEVERITY
	ENV RDWY FACTORS: NONE												HIT FIXED OBJ
	MIDB 2012/0020/2654												
	VEH: 1 AUTOMOBILE TRAVELING WEST IN RIGHT LANE GOING STRAIGHT												ALC TEST: 99
	VEH EVENTS: HIT GUARD / GUIDE RAIL HIT CULVERT												
	DVR ACTIONS: SPEEDING TOO FAST FOR CONDITIONS OTHER IMPROPER DRIV ACTIONS												
17	2014078131	48	08/11/2014	MON	19:46	DAYLIGHT	DRY	CLEAR	0	1	0	1	UNK SEVERITY
	ENV RDWY FACTORS: NONE												HIT FIXED OBJ
	MIDB 2012/0020/2872												
	VEH: 1 AUTOMOBILE TRAVELING EAST IN RIGHT LANE GOING STRAIGHT												
	VEH EVENTS: HIT UTILITY POLE HIT UTILITY POLE												
	DVR ACTIONS: DRIVER INEXPERIENCED DRIVER WAS DISTRACTED												
18	2012086692	48	08/14/2012	TUE	20:10	DUSK	DRY	CLEAR	0	1	0	1	MINOR INJURY
	ENV RDWY FACTORS: NONE												ANGLE
	MIDB 2012/0020/2967												
	VEH: 1 SMALL TRUCK TRAVELING EAST IN RIGHT LANE NEGOTIATING CURVE - LEFT												
	VEH EVENTS: HIT UNIT 02												
	DVR ACTIONS: OVER/UNDER COMPENSATE CURVE												
	VEH: 2 PEDALCYCLE TRAVELING EAST IN SHOULDER RIGHT NEGOTIATING CURVE - LEFT												
	VEH EVENTS: STRUCK BY UNIT 01												
	DVR ACTIONS: NO CONTRIBUTING ACTION												

NOTES:

1 The data available in this application is dynamic and should be used with care. Please take note of the following data alerts:

2 2015 crash records are incomplete
Data for the current year, 2015, is not fully represented in CDART. Crashes will be added for this year as they are made available to the Department. Include this year in queries with caution.

3 Complete data years
Complete records of reportable crashes are available in CDART for the following years : 1997 - 2014

REPORT PARAMETERS:

Query ID: 0520160204007
User ID: coswald
Area of Interest: (In County 48 On State Route 2012(P) Between Segment 0010 Offset 0 and Segment 0030 Offset 1835)

Date Range: 1/1/2010 to 12/31/2014

Criteria: STATE ROAD

NORTHAMPTON COUNTY: PORTION OF STATE ROUTE 2012 (FOR PENNONI)

Sorted by County, Route, Number of Crashes
Date Range: 1/1/2010 to 12/31/2014

Area of Interest: (In County 48 On State Route 2012(P) Between Segment 0010 Offset 0 and Segment 0030 Offset 3360)

USER ID / QUERY ID:
coswald / 0520160204008

DISTRICT	COUNTY		ROUTE	SEGMENT	MIN OFFSET	MAX OFFSET	LENGTH	CRASHES	TOT_INJ	MAJ_INJ	FATAL	AVG ADT	CRASH RATE	HOMOG. RATE (5YR)	MUNICIPALITY	DELTA
05	48	NORTHAMPTON	2012	0010	0	2155	0.54	14	13	1	0	1074	13.22	1.52	48301	8.70
05	48	NORTHAMPTON	2012	0020	1988	2967	0.67	4	4	0	0	1074	3.06	1.52	48210	2.02
05	48	NORTHAMPTON	2012	0030	2526	2526	0.64	2	2	0	0	1074	1.60	1.52	48210	1.05

NORTHAMPTON COUNTY: PORTION OF STATE ROUTE 2012 (FOR PENNONI)

Sorted by County, Route, Number of Crashes

NOTES:

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*** SPECIAL NOTE :** DELTA is calculated as CRASH RATE / HOMOG. RATE (5YR) and is an indicator of how the actual crash rate compares to average Statewide crash rates for roadway segments having similar characteristics. This value represents a valid comparison only with the assumption that crashes occuring in the segment are evenly distributed through the years within the query Date Range. Use caution when comparing actual rate to homogeneous rate when query date range is not equal to 5 years.

QUERY PARAMETERS:

Note: This report includes data for state roads only.

Query ID: 0520160204008

User ID: coswald

Minimums: 1 Crashes / 1 AADT / 0 miles

Area of Interest: (In County 48 On State Route 2012(P) Between Segment 0010 Offset 0 and Segment 0030 Offset 3360)

Date Range: 1/1/2010 to 12/31/2014

Criteria: STATE ROAD

NORTHAMPTON COUNTY: PORTION OF STATE ROUTE 2012 (FOR PENNONI)

Sorted by County, Route, Number of Crashes
Date Range: 1/1/2011 to 12/31/2015

Area of Interest: (In County 48 On State Route 2012(P) Between Segment 0010 Offset 0 and Segment 0030 Offset 3360)

USER_ID / QUERY ID:
coswald / 0520160727002

DISTRICT	COUNTY		ROUTE	SEGMENT	MIN OFFSET	MAX OFFSET	LENGTH	CRASHES	TOT_INJ	MAJ_INJ	FATAL	AVG ADT	CRASH RATE	HOMOG. RATE (5YR)	MUNICIPALITY	DELTA
05	48	NORTHAMPTON	2012	0010	0	1012	0.54	11	12	1	0	1074	10.39	1.54	48301	6.75
05	48	NORTHAMPTON	2012	0020	931	2967	0.67	3	3	0	0	1074	2.30	1.54	48210	1.49
05	48	NORTHAMPTON	2012	0030	2526	3210	0.64	3	2	0	0	1074	2.41	1.54	48210	1.56

NORTHAMPTON COUNTY: PORTION OF STATE ROUTE 2012 (FOR PENNONI)

Sorted by County, Route, Number of Crashes

NOTES:

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Data for the current year, 2016, is not fully represented in CDART. Crashes will be added for this year as they are made available to the Department. Include this year in queries with caution.

3 Complete data years
Complete records of reportable crashes are available in CDART for the following years : 1997 - 2015

*** SPECIAL NOTE :** DELTA is calculated as CRASH RATE / HOMOG. RATE (5YR) and is an indicator of how the actual crash rate compares to average Statewide crash rates for roadway segments having similar characteristics. This value represents a valid comparison only with the assumption that crashes occuring in the segment are evenly distributed through the years within the query Date Range. Use caution when comparing actual rate to homogeneous rate when query date range is not equal to 5 years.

QUERY PARAMETERS:

Note: This report includes data for state roads only.

Query ID: 0520160727002

User ID: coswald

Minimums: 1 Crashes / 1 AADT / 0 miles

Area of Interest: (In County 48 On State Route 2012(P) Between Segment 0010 Offset 0 and Segment 0030 Offset 3360)

Date Range: 1/1/2011 to 12/31/2015

Criteria: STATE ROAD

Warning Sign Analysis

Project Description

Existing Roadway Characteristics

Applebutter Road (SR 2012) is an east-west State Road extending from Shimersville Road (SR 2014) to the west toward Island Park Road to the east. The road has one travel lane in each direction within the study area. There is a double yellow centerline, white edge line, and raised pavement markings present along the studied area of roadway. Applebutter Road (SR 2012) is classified as an urban collector according to PENNDOT's Northampton County Federal Functional Class Map and has a roadway typology of neighborhood collector. The roadway is under PENNDOT jurisdiction and is posted with a speed limit of 35 and 40 MPH, but advisory speeds of 15 and 20 MPH are posted due to horizontal and vertical curvature of the roadway. The intersection of Applebutter Road (SR 2014) and Shimersville Road (SR 2014) is an unsignalized T-shaped intersection with stop control for the Applebutter Road (SR 2014) approach. This approach includes a stop-controlled channelized right turn lane.

Existing Route Operational Assessment & Conclusions

In 2011-2012, PennDOT improved the signage along Applebutter Road, such that the existing signage is consistent with PennDOT standards, including advance warning signs for roadway curvatures. Nevertheless, Pennoni conducted a field view to assess the existing signage and provide recommendations to further improve/enhance the signing along Applebutter Road.

While the vast majority of the signs are properly located, we offer the following suggestions to improve signing on the roadway. It should be noted that the field view of Applebutter Road (SR 2012) extended beyond the Lower Saucon Township boundaries into the City of Bethlehem. The suggestions noted in SR 2012 SEG 0010 are located in the City of Bethlehem.

- The existing Stop Ahead (W3-1) could be relocated east on Applebutter Road (SR 2012) so that it is a minimum 250ft from the intersection of Shimersville Road (SR 2014) to provide adequate advance warning of the stop sign in accordance with Pub 236.
- Additional Chevron Alignment (W1-8) signs could be installed on the sharp turn on Applebutter Road near (SR 2012) SEG 0010 OFF 1000 in accordance with The MUTCD Figure 2C-2 to supplement the Large Single Arrow (W1-6) signs.
- A Slow Curve Arrow could be painted in the eastbound lane of Applebutter Road (SR 2012) in advance of the sharp turn at approximately SR 2012 SEG 0010 OFF 2000 in accordance with Pub 111 Pavement Marking Standards TC-8600.
- A Right Clearance Marker (OM-3R) could be installed in the westbound shoulder on Applebutter Road (SR 2012) near the pipe culvert crossing at SR 2012 SEG 0030 OFF 1580.

TABLE 1.A

SIGN		SERIES	DESCRIPTION	SIZE		STATION	
1	A		SR 2012 SEG 0030 AHEAD	12 X 12	A	0	L
1	B	R4-1	DO NOT PASS	24 X 30	A	104	R
1	C	R2-1	35 MPH SPEED LIMIT	24 X 30	A	104	R
1	D	W3-1	STOP AHEAD	30 X 30	D	140	L
1	E	W1-5R	RIGHT WINDING ROAD	30 X 30	A	256	R
1	F	W13-1P	20MPH ADVISORY SPEED	24 X 24	A	256	R
1	G	D1-3	BETHLEHEM LEFT/ FREEMANSBURG RIGHT/ STEEL CITY RIGHT	72 X 36	D	419	L
1	H	W1-6	LARGE SINGLE ARROW (LEFT)	48 X 24	D	962	L
1	I	W13-1P	20MPH ADVISORY SPEED	24 X 24	D	962	L
1	J	W1-6	LARGE SINGLE ARROW (RIGHT)	48 X 24	A	969	L
1	K	W13-1P	20MPH ADVISORY SPEED	24 X 24	A	969	L
1	L	W1-8	CHEVRON ALIGNMENT (LEFT)	18 X 24	A	1256	R
		W1-8	CHEVRON ALIGNMENT (RIGHT)	18 X 24	D	1256	R
1	M		EASTON RD (INTERSECTION)			1268	L
1	N	W1-8	CHEVRON ALIGNMENT (LEFT)	18 X 24	A	1294	R
1	O	W1-8	CHEVRON ALIGNMENT (RIGHT)	18 X 24	D	1294	R
1	P	W1-8	CHEVRON ALIGNMENT (LEFT)	18 X 24	A	1326	R
1	Q	W1-8	CHEVRON ALIGNMENT (RIGHT)	18 X 24	D	1326	R
1	R	W1-8	CHEVRON ALIGNMENT (LEFT)	18 X 24	A	1361	R
1	S	W1-8	CHEVRON ALIGNMENT (RIGHT)	18 X 24	D	1361	R
1	T	W1-8	CHEVRON ALIGNMENT (LEFT)	18 X 24	A	1413	R
1	U	W1-8	CHEVRON ALIGNMENT (RIGHT)	18 X 24	D	1413	R
1	V	W1-1L	LEFT TURN	30 X 30	A	1695	R
1	W	W13-1P	15MPH ADVISORY SPEED	24 X 24	A	1695	R
1	X	W1-8	CHEVRON ALIGNMENT (LEFT)	18 X 24	A	1974	R
1	Y	W1-8	CHEVRON ALIGNMENT (RIGHT)	18 X 24	D	1974	R
1	Z	W1-8	CHEVRON ALIGNMENT (LEFT)	18 X 24	A	2002	R
2	A	W1-8	CHEVRON ALIGNMENT (RIGHT)	18 X 24	D	2002	R
2	B	W1-8	CHEVRON ALIGNMENT (LEFT)	18 X 24	A	2029	R
2	C	W1-8	CHEVRON ALIGNMENT (RIGHT)	18 X 24	D	2029	R
2	D	W1-6	LARGE SINGLE ARROW (LEFT)	48 X 24	A	2104	R
2	E	W13-1P	15MPH ADVISORY SPEED	24 X 24	A	2104	R
2	F	W1-8	CHEVRON ALIGNMENT (LEFT)	18 X 24	A	2116	R
2	G	W1-8	CHEVRON ALIGNMENT (RIGHT)	18 X 24	D	2116	R
2	H	W1-6	LARGE SINGLE ARROW (RIGHT)	48 X 24	D	2136	R
2	I	W13-1P	15MPH ADVISORY SPEED	24 X 24	D	2136	R
2	J	W1-8	CHEVRON ALIGNMENT (LEFT)	18 X 24	A	2154	R
2	K	W1-8	CHEVRON ALIGNMENT (RIGHT)	18 X 24	D	2154	R
2	L	W1-8	CHEVRON ALIGNMENT (LEFT)	18 X 24	A	2175	R
2	M	W1-8	CHEVRON ALIGNMENT (RIGHT)	18 X 24	D	2175	R
2	N	R2-1	35 MPH SPEED LIMIT	24 X 30	A	2252	R
2	O		W/24"		D	2326	L
2	P		RIGHT TURN ARROW		D	2343	L
2	Q		SLOW		D	2354	L
2	R		W/24"		D	2362	L
2	S	W1-1R	RIGHT TURN	30 X 30	D	2440	L
2	T	W13-1P	15MPH ADVISORY SPEED	24 X 24	D	2440	L
2	U	W1-2L	LEFT CURVE SIGN	30 X 30	A	2464	R
2	V	W13-1P	35MPH ADVISORY SPEED	24 X 24	A	2464	R
2	W	R2-1	35 MPH SPEED LIMIT	24 X 30	D	2727	L
2	X		SR 2012 SEG 0020 AHEAD	12 X 12	A	2852	L
2	Y		SR 2012 SEG 0010 BACK	12 X 12	D	2852	L
2	Z	W11-103	DRIVEWAY AHEAD	30 X 30	D	3141	L
3	A	R2-1	40 MPH SPEED LIMIT	24 X 30	A	3220	R
3	B	W1-2R	RIGHT CURVE SIGN	30 X 30	D	3313	L
3	C	W13-1P	35MPH ADVISORY SPEED	24 X 24	D	3313	L
3	D	W1-1R	RIGHT TURN	30 X 30	A	3382	R
3	E	W13-1P	15MPH ADVISORY SPEED	24 X 24	A	3382	R
3	F	S3-1	SCHOOL BUS STOP AHEAD	30 X 30	A	3688	R
3	G	W7-3AP	NEXT 3/4 MILES PLAQUE	24 X 18	A	3688	R
3	H	OM-3R	RIGHT CLEARANCE MARKER	12 X 36	A	4248	R
3	I	OM-3L	LEFT CLEARANCE MARKER	12 X 36	D	4252	R
3	J	OM-3L	LEFT CLEARANCE MARKER	12 X 36	A	4259	L
3	K	OM-3R	RIGHT CLEARANCE MARKER	12 X 36	D	4271	L
3	L	W1-1L	LEFT TURN	30 X 30	D	4353	L
3	M	W13-1P	30MPH ADVISORY SPEED	24 X 24	D	4353	L
3	N	R2-1	40 MPH SPEED LIMIT	24 X 30	A	4617	R
3	O	R2-1	40 MPH SPEED LIMIT	24 X 30	D	5164	L
3	P		SR 2012 SEG 0030 AHEAD	12 X 12	A	6370	R
3	Q		SR 2012 SEG 0020 BACK	12 X 12	D	6370	R
3	R	R2-1	40 MPH SPEED LIMIT	24 X 30	D	6561	L
3	S	R2-1	40 MPH SPEED LIMIT	24 X 30	A	6630	R
3	T	OM-3R	RIGHT CLEARANCE MARKER	12 X 36	A	7903	R
3	U	OM-3L	LEFT CLEARANCE MARKER	12 X 36	D	7920	R
3	V	OM-3L	LEFT CLEARANCE MARKER	12 X 36	A	7938	L
3	W	S3-1	SCHOOL BUS STOP AHEAD	30 X 30	D	7981	L
3	X	W7-3AP	NEXT 3/4 MILES PLAQUE	24 X 18	D	7981	L
3	Y	R2-1	40 MPH SPEED LIMIT	24 X 30	A	8112	R
3	Z		BETHLEHEM LANDFILL DRIVEWAY			8112	L
4	A	W1-1R	RIGHT TURN	30 X 30	A	8420	R
4	B	W13-1P	30MPH ADVISORY SPEED	24 X 24	A	8420	R
4	C	R2-1	40 MPH SPEED LIMIT	24 X 30	D	8658	L
4	D	W1-1L	LEFT TURN	30 X 30	D	9126	L
4	E	W13-1P	30MPH ADVISORY SPEED	24 X 24	D	9126	L
4	F	W1-3R	RIGHT REVERSE TURN	30 X 30	A	9160	R
4	G	W13-1P	20MPH ADVISORY SPEED	24 X 24	A	9160	R
4	H	W1-8	CHEVRON ALIGNMENT (LEFT)	18 X 24	A	9730	R
4	I	W1-8	CHEVRON ALIGNMENT (RIGHT)	18 X 24	D	9730	R
4	J		SR 2012 SEG 0040 AHEAD	12 X 12	A	9730	R
4	K		SR 2012 SEG 0030 BACK	12 X 12	D	9730	R
4	L		RINGHOFFER ROAD (INTERSECTION)			9763	R
4	M	W1-8	CHEVRON ALIGNMENT (LEFT)	18 X 24	A	9795	R
4	N	W1-8	CHEVRON ALIGNMENT (RIGHT)	18 X 24	D	9795	R

Attachment 8

OS-2 (12-15)

1162.3

pennsylvania
DEPARTMENT OF TRANSPORTATION

September 23, 2016

Ms. Leslie Huhn
Lower Saucon Township
3700 Old Philadelphia Pike
Bethlehem, PA 18015

Re: Northampton County – Lower Saucon Township - State Route 2012

Dear Ms. Huhn:

This is in response to your letter dated September 12, 2016, regarding the analysis of accidents and evaluation of curves/signage along State Route 2012 (Applebutter Road) in Lower Saucon Township, Northampton County.

We have reviewed the report and generally agree with the analysis findings. Our sign foreman for this area will perform a field review of the existing signing and make changes or additions if warranted.

Should you require any additional information, please contact District Traffic and Operations Engineer Dennis Toomey, PE, at 610.871.4475.

Sincerely,

Michael W. Rebert, PE
District Executive
Engineering District 5-0

S cc: City of Bethlehem
10 East Church Street
Bethlehem, PA 18018

ROUTING
- [x] Council
- [x] Manager
- [ ] Asst. Mgr.
- [x] Zoning
- [ ] Finance
- [x] Police
- [x] P. Works
- [ ] P/C
- [ ] P & R
- [ ] EAC
- [x] Engineer
- [ ] Solicitor
- [ ] Planner
- [x] Landfill
- [ ] EMC
- [ ] Other

orig

Attachment 9

martin and martin, incorporated

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September 21, 2016

PaDEP – Northeast Regional Office
Attn: Mr. Roger Bellas
2 Public Square
Wilkes-Barre, PA 18711

RE: Bethlehem Landfill
LDZ Flows – Phase III
Our file: b/1162.1/2016/ltr81216

Dear Mr. Bellas:

Following up on our correspondence and meetings, we are submitting herewith Bethlehem Landfill's plan to further evaluate and reduce the flows in the Phase III leachate detection zones (LDZ).

HISTORY

Reviewing the history of said flows and various prior investigations and remedial actions, we note:

1. The flows are not from ground water, are primarily influenced by stormwater, and do show some contribution from leachate. Stormwater appears to be entering the detection zone through stormwater saturation of the Phase III anchor trenches in which the primary and secondary liners are not welded together.

   Over the years, the Landfill has taken steps that have reduced the LDZ flows, including welding the primary to secondary liner in the North anchor trenches of Phase III, which clearly resulted in a substantial reduction in the LDZ flows, and installation of anchor trench toe drains along the south anchor trench – which similarly reduced said LDZ flows. (See Attachment 1 for a summary of the investigations, evaluations, and results of the above noted implemented measures relative to the LDZ flows, Attachment 2 for the areas of Phase III tributary to the LDZs, and Attachment 3 for the south toe drain installations.)

2. The LDZ flows are being addressed and appropriately managed in accordance with applicable DEP Regulations. (See Attachment 4 for DEP's comments on the "severity" of the LDZ flows.)

ACTION PLAN

In order to further address these LDZ flows, the following steps are proposed to be taken:

1. Landfill personnel will verify that the south anchor trench toe drains (Attachment 3) are not clogged, and after each significant rainfall event will check to be certain the drains are discharging without obstructions. Bethlehem's current Post Rainfall Event Inspection Form has been revised to add the anchor trench drains inspections to the Form (Attachment 5).

2. Landfill personnel have inspected the LDZ flow metering system, have found some build-up in the pipes and have cleaned them, and are in the process of cleaning others. The flow metering devices will be recalibrated associated with the LDZ 6-8 discharges to insure that the data collected continue to be accurate.

3. Landfill personnel will, on a regular basis, check the pipes and metering devices to assure that they are accurately recording the flow data.

4. With the construction of the Southeastern Realignment's proposed Cells SE 1-A and SE 1-B, the primary and secondary liners of the eastern perimeter of the Phase III area will be exposed for new liner connection to said new cells. The proposed overtopping of that perimeter with new waste, following connection of the new 'piggyback liner' with the existing Phase III liner, which will eliminate the possibility of stormwater introduction into the perimeter anchor trench and eliminate flow therein to points along that existing trench where it may be entering the detection zone. At the time of the new cell construction, those two Phase III liner systems will be welded to the Cells SE 1-A and SE 1-B liner systems, eliminating introduction of stormwater into the subject detection zones from that area. Thus, following this connection, the only remaining anchor trench edge will be along the south side, which has had the toe drains installed, and which has 15+ feet of soil atop the anchor trench.

In the event any questions arise concerning this correspondence please don't hesitate to contact this office at your convenience.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Richard M. Bodner, P.E.

Attachments
cc: Bethlehem Landfill
LAW
Lower Saucon Twp.

IESI PA Bethlehem Landfill Corp.
A Progressive Waste Solutions Co.
Investigation of
Phase III
Leachate Detection Zones
July 2015

Prepared for:
IESI PA Bethlehem Landfill Corp.
PADEP SWP #100020
Lower Saucon Township
Northampton County, Pennsylvania

Prepared by:
Martin and Martin, Incorporated
37 South Main Street, Suite A
Chambersburg, PA 17201

and

Meiser & Earl, Inc.
1512 W. College Ave.
State College, PA 16801

Robert M. Hershey, P.G.
Principal Hydrogeologist
Meiser & Earl, Inc.

Richard M. Bodner, P.E.
Principal Engineer
Martin and Martin, Inc.

ATTACHMENT 1

TABLE OF CONTENTS

TABLES

DRAWINGS/MAPS

BACKGROUND

Meiser & Earl, Inc. (M&E), in collaboration with Martin and Martin, Inc. (MM), prepared four reports for IESI Bethlehem Landfill Corporation (Bethlehem Landfill) that summarized the investigations, remediation, or evaluation of the high-flow rates in the Phase III Area detection zones. The titles and the dates of these four reports are:

Investigation of High Flow Rates
Phase III Area
Detection Zones
December 2008

Phase III Area
Detection Zones
April 2009

Gabion Downdrain Test
LMC-7 and LMC-8
Phase III Area
Detection Zones
November 2009

Investigation of
Gabion Down Drain and Toe Drain
Phase III Cell 3C Area
LMC-8 Detection Zone
June 2010

All these reports dealt with detection zone flows in the Phase III area and for simplicity, beginning with the April 2009 report, we referred to a detection zone as DZ and the leachate collection system as LC. The number associated with the leachate management chamber (LMC) is also used in the designation. For example, the detection zone associated with LMC-8 became DZ-8. There are three detection zones labeled DZ-6, DZ-7, and DZ-8 in the Phase III area.

In addition, MM submitted the following report that described the continued investigation of the toe drain along the southern perimeter of the Landfill Cell 3-C footprint (DZ-8 drainage area):

Toe Drain Investigation
Phase III Cell 3C Area
LMC-8 Detection Zone
July 2011

This, the sixth report, summarizes the conclusions of the first four reports by providing the introduction, conclusions, and recommendations or additional measures, if any, of those four reports to show the extent of work that was performed through June 2010. In addition, the fifth report by MM is summarized. The flow in DZ-8 is evaluated further in this report as a result of the toe drain repairs from April 1 to 8, 2010 and from May 2 to 10, 2011.

We have not included the tables, figures, maps and appendices from the previous reports. However, we have included the LMC Investigation Drawing from the June 2010 report that shows the general layout of the Cells and LMC areas in the Phase III (3) area, the 2011 Toe Drain Investigation Drawing, and the Groundwater Contour Plan, Fourth Quarter 2014, that was also included in the Annual Review of the 2014 Monitoring Year report.

DECEMBER 2008 REPORT

Introduction – December 2008

On behalf of IESI Bethlehem Landfill Corp. (Bethlehem Landfill), and in collaboration with Martin and Martin, Inc. (MM), Meiser & Earl, Inc. (M&E) has prepared the following report on the investigation proposed in the work plan outlined in the May 6, 2008, letter from Richard M. Bodner, P.E. of MM, to William Tomayko, PADEP Environmental Program Manager of the Waste Management Program. Mr. Tomayko approved the work plan in his May 22, 2008, letter to Bethlehem Landfill. The purpose of this investigation is to evaluate the high flow rates in the detection zones in the Phase III area of the Bethlehem Landfill.

The work plan consisted of three parts. First, water levels were measured in the standpipes associated with the leachate collection and detection zones next to Leachate Management Chambers (LMCs) 6, 7, and 8, followed by the incremental removal of the pipe restrictions in the leachate detection piping. These restrictions consisted of reduced pipe diameters in the concrete leachate chamber box, which allowed liquid to accumulate in the detection zones. Flows were also recorded from the leachate and detection zone flow meters for LMC-6, LMC-7, LMC-8, and Phase IV (at Cell 4C Sump) up to several times daily from July 24 through August 1, 2008, during the pipe restriction removals. Second, water was pumped into the inlet end of the 36-inch-diameter stormwater pipe that is located within the waste mass of the areas draining to LMC-7 and LMC-8, beginning on September 23rd. Finally, water was pumped into the head of the gabion downdrain located on the south slope of the area draining to LMC-8, beginning on October 21st. Flows were recorded from the leachate and detection zone flow meters for LMC-6, LMC-7, LMC-8, and Phase IV several times daily from September 23 through October 31, 2008, beginning before the stormwater pipe test and continuing to after the gabion downdrain test.

Conclusions – December 2008

1. The incremental removal of the detection pipe restrictions in LMC-6, LMC-7, and LMC-8 in July 2008 resulted in short-term flow increases in each of these detection systems. The flow monitoring and water-level measurements of the leachate and detection zone systems for LMC-6, LMC-7, LMC-8, and Phase IV did not indicate the pipe restriction

removal impacted the other adjacent or nearby leachate and detection zone flows or standpipe water levels. The one exception is that the LMC-8 leachate flow increased when the LMC-8 detection flow increased.

2. The LMC-6 leachate and detection flows showed essentially no response to the 36" stormwater pipe test, the gabion downdrain test, or precipitation.

3. The 36" pipe and gabion tests appear to have had little impact on the LMC-7 leachate and detection flows, particularly within the first several days after the tests. The precipitation that occurred several days after these two tests appears to be the more likely source of the significant increase in LMC-7 detection zone flows. There were very small increases in the LMC-7 leachate flows during the same time period as the detection flow increases after the 36" pipe and gabion tests, which may also be related to the precipitation.

4. The dramatic increase in the LMC-8 detection flow and the increase in the LMC-8 leachate flow at the end of September seem to be from the precipitation immediately preceding these increases and not the 36" pipe test.

5. The significantly larger increase in LMC-8 leachate flow after the gabion test, compared to the 36" pipe test, strongly suggests that this flow was impacted by the water from the gabion testing and to a lesser extent from the recent precipitation.

6. The LMC-8 detection zone flow increase after the gabion test is most likely from precipitation.

7. The Phase IV detection zone flow was not impacted by the 36" pipe test, the gabion test, or precipitation.

8. The Phase IV leachate zone flows were so sporadic that the flow rate changes could not be assessed properly.

Recommendations – December 2008

1. After the capping of the LMC-7 and LMC-8 areas is completed, the flow response to precipitation should be re-evaluated. Flow meter readings for the LMC-7 and LMC-8 leachate and detection zones should be recorded at least at the beginning, middle, and end of each day preceding a large precipitation (rainfall) event. The measurements should continue for at least a week after the precipitation event or until flows return to the levels seen before the precipitation event.

2. After the capping is completed for LMC-8, the gabion test could be repeated to assess if the source of water into the LMC-8 leachate zone has been eliminated.

APRIL 2009 REPORT

Introduction – April 2009

Meiser & Earl, Inc. (M&E), in collaboration with Martin and Martin, Inc. (MM), prepared a report for IESI Bethlehem Landfill Corporation (Bethlehem Landfill) in December 2008 that summarized the investigation of the high-flow rates in the Phase III Area detection zones. The December 2008 report concluded that the 36-inch stormwater pipe and the gabion downdrain in the Phase III area did not impact the flow in the Area III detection zones, and that the most likely source of the increased flows in LMC-7 and LMC-8 detection zones was stormwater.

For simplicity, in this report we refer to a detection zone as DZ and the leachate collection system as LC. The number associated with the leachate management chamber (LMC) is also used in the designation. For example, the detection zone associated with LMC-8 is now DZ-8 and the leachate collection system for LMC-8 is LC-8. We have evaluated the flows in DZ-6, DZ-7, and DZ-8, even though, as stated in the December 2008 report, DZ-6 did not have an increased flow issue. Essentially, DZ-6 becomes a control area for evaluation purposes.

This report presents the results of an additional evaluation of the increased flows and their possible sources. We have evaluated whether ground water is a possible source of the increased flows. The water chemistry of the LC and associated DZ were compared for each of the three areas to assess whether the source of the increased DZ flows is from the overlying LC system. Similarly, flows between the LC and associated DZ were compared to assess if the source of the increased flows is from the overlying LC system. Finally, we evaluated the water quality in the monitoring wells and abatements wells downgradient of DZ-6, DZ-7, and DZ-8 to assess whether the increased flows impacted the chemistry in these wells.

Conclusions – April 2009

1. Detection zone flow in DZ-6, DZ-7, and DZ-8 is not from ground water.
2. The detection zone chemistry is primarily influenced by stormwater.
3. The flow characteristics of the detection zones compared to the overlying leachate collection systems show that the increased flows in DZ-7 and DZ-8 are not directly related to the overlying leachate collection system.
4. The removal of the detection zone flow restrictions in July 2008 appears to have resulted in more erratic and higher flows in DZ-7 and DZ-8.
5. Stormwater is the most likely source of the diluting water and increased flows in DZ-7 and DZ-8.

6. Increased pumping in the abatement wells beginning in 2006 has created a more effective ground-water trough, with the nitrates either decreasing or stabilizing in the wells downgradient of the ground-water trough.

7. The monitoring wells downgradient of the abatement well ground-water trough are in compliance.

Additional Measures – April 2009

Using geophysical techniques, as was suggested by the PADEP, is extremely difficult in completed, filled, and capped cells, and not likely to produce meaningful results. While these techniques may identify saturated soil zones, these zones of saturation may or may not be the location of the water inflow into the detection zone.

IESI instead is going to excavate the northern edge of the liner area along the length of the Phase III Cell 3-D area (approximately 1200 feet) and weld the primary liner to the secondary liner. This is the most likely area for the stormwater inflow into the detection zone, due to the proximity of a stormwater channel running parallel and adjacent to the northern edge of the anchor trench. In addition, IESI will complete the capping of the Phase III Area by the end of 2009.

NOVEMBER 2009 REPORT

Introduction – November 2009

On behalf of IESI Bethlehem Landfill Corp. (IESI), and in collaboration with Martin and Martin, Inc. (MM), Meiser & Earl, Inc. (M&E) has prepared the following report on the retesting of the gabion downdrain located over Cell 3-C (Phase III Area), which drains to leachate management chamber LMC-8, and the response to precipitation in the leachate and detection zones for LMC-7 and LMC-8. This testing was recommended in the December 2008 report prepared by M&E in collaboration with MM, once the capping over the LMC-7 and LMC-8 areas was completed. In addition to completing said capping, IESI welded the primary liner to the secondary liner at the northern edge of Cell 3-D (LMC-7). The capping and liner welding were completed on September 15, 2009, but flow measurements were recorded beginning on August 21 in LMC-8 and September 9 in LMC-7, through November 3, 2009, in order to evaluate the impacts of precipitation.

Water was pumped onto the gabion downdrain on September 24, 2009, and measurements in LMC-7 and LMC-8 continued to November 3, 2009, in order to evaluate the impact of precipitation on these areas.

Each leachate management chamber includes flow meters for the leachate, which is piped through each chamber under gravity conditions. The leachate detection zone flow, however, drains by gravity piping into a sump inside the chamber and then is pumped into the pipe in which the flow meter is located. The detection zone flow is then piped into the leachate system. For simplicity, in this report, we refer to a detection zone as DZ and the leachate collection

system as LC. The number associated with the leachate management chamber (LMC) is also used in the designation. For example, the leachate collection system for LMC-8 is LC-8, and the detection zone associated with LMC-8 is DZ-8.

Conclusions – November 2009

1. The recent capping and liner welding that were completed in mid September 2009 have reduced the influence of precipitation in DZ-7 to well within acceptable levels, and DZ-7 requires no further evaluation.

2. There was an increase in flow in LC-8 on September 25 of 4 to 7 GPH as a result of the gabion test on September 24. By the second reading on September 26, the flow in LC-8 had returned to the pre-gabion test rate.

3. There was an increase in flow in DZ-8 on September 25 of 8 GPH as a result of the gabion test. By the morning of September 26, the flow had returned to the pre-gabion test rate.

4. After four rainfall events, the flow in DZ-8 increased sooner and to a much higher rate than the overlying leachate collection system, LC-8. Thus, the increase in flow in DZ-8 is from stormwater, not from leachate in the overlying LC-8 system.

5. The rainfall events appear to have increased the flow in DZ-8 more on a proportional basis than the water from the gabion test.

Additional Measures – November 2009

1. IESI will open the area at the base of the gabion downdrain in order inspect the area for water infiltration.

2. The toe drain of the cap, where it connects into the gabion downdrain will be inspected for blockage and ease of water flow, in order to assess whether there is water ponding in the toe drain at the base of Cell 3-C above LMC-8.

3. The work plan to inspect the gabion downdrain and toe drain is attached in Appendix II.

JUNE 2010 REPORT

Introduction – June 2010

On behalf of IESI Bethlehem Landfill Corp. (IESI), Martin and Martin, Inc. (MM) and Meiser & Earl, Inc. (M&E) have prepared the following report on the inspection of the gabion down drain and the toe drain of the cap at the base of Cell 3-C (Phase III Area) above Leachate Management Chamber 8 (LMC-8). This investigation was described in the work plan prepared by Martin and Martin in Appendix II of the November 2009 report of the Gabion Down Drain Test. Drawing LMC Flow Investigation, shows the areas of LMC-6, LMC-7, and LMC-8 in the

Phase III area. Improvements were made to the toe drain, and the primary liner was welded to the secondary liner in the area exposed during the excavation. This work began on April 1, 2010 and was completed on April 8, 2010. The flow in the detection zone associated with LMC-8, detection zone DZ-8, was evaluated to determine if it responded to these improvements.

Conclusion – June 2010

Based on comparing two similar precipitation events to subsequent weekly flow measurements for DZ-8, the improvements to the toe drain and liner systems from April 1 to 8, 2010, at the base of Cell 3-C, reduced the stormwater flow into DZ-8 by approximately 85 to 90 percent.

TOE DRAIN INVESTIGATION
PHASE III CELL 3C AREA
LMC-8 DETECTION ZONE
JULY 2011

On May 2, 2011 IESI continued with its investigation of the existing toe drain along the South perimeter of the Landfill Cell 3-C (DZ-8) footprint. Cell 3-C is shown on the LMC Flow Investigation Drawing. The investigation of the toe drain in the LMC-8 drainage area consisted of excavating down to the interface of the Cell 3-C liner system with the cap liner system. Excavation was conducted with the site's smooth bucket excavator, and the area was monitored for the presence of any landfill gas.

Upon excavation it was found that water was being trapped along the edge of the roadway due to silt building up in the toe drain piping. In order to relieve the standing water, additional toe drain piping was installed at this interface, as shown on the 2011 Toe Drain Investigation Drawing. The tie-in location for replacement toe drain piping was determined by visually inspecting the existing toe drain piping until a clean toe drain was encountered. The additional toe drain piping was installed from the Eastern side of the gabion DS-1 and then extended across the roadway to Basin 4 to promote drainage from the Cell/Cap liner system interface. Further additional toe drain piping was installed to the East of the gabion downdrain and extended to the limit of the LMC-8 drainage area (Cell 3-C). The toe drain was extended across the roadway in two more locations to facilitate drainage. The work was completed on May 10, 2011.

CURRENT
EVALUATION OF
TOE DRAIN REPAIRS
APRIL 2010 & MAY 2011
ON DETECTION ZONE 8

Introduction

This current report is a further evaluation of the chemistry and flow data from Leachate Detection Zone 8 (DZ-8), associated with Leachate Management Chamber 8 (LMC-8). The toe drain at the base of the cap of Cell 3-C (Phase III) above LMC-8 was repaired from April 1 to 8,

2010, and from May 2 to 10, 2011. The April 2010 toe drain repair was described in the June 2010 report that was prepared by Meiser & Earl, Inc. and Martin and Martin, Inc., and the May 2011 toe drain repair was described in the July 2011 report that was prepared by Martin and Martin, Inc. In order to evaluate the impact of the two repairs, we have compared the data of nearly four years before the first toe drain repair (June 2, 2006 to April 2, 2010) to the nearly four years of data after the second toe drain repair (June 3, 2011 to April 3, 2015). Due to flow measurement problems in May of 2006, we could only go back in time to June 2006 for the DZ-8 flows.

Evaluation

In order to compare data from before the toe drain repairs to after the toe drain repairs, we calculated the average, or mean, and the standard deviation for each set of data. The weekly flow data from June 2, 2006 through April 2, 2010 are listed in Table 1, and the weekly flow data from June 3, 2011 through April 3, 2015 are listed in Table 2. Due to a meter failure, the flow data from December 19, 2013 through January 17, 2014 could not be used. The flows typically represent the average over the previous 7 days, but the time in days of the flow period is listed in Tables 1 and 2. The tables include the detection zone meter reading, total flow over the time period, flow in gallons per day, and the flow in gallons per acre per day. DZ-8 covers 5.8 acres.

We have selected alkalinity, ammonia nitrogen, chemical oxygen demand (COD), chloride, sodium, potassium, nitrate nitrogen, and total dissolved solids (TDS) as the eight key chemistry parameters for evaluation. The chemistry parameters for the 16 quarters before and 16 quarters after the toe drain repairs are listed in the upper and lower section of Table 3, respectively. Table 4 provides a comparison of the flow and chemistry data before April 2010 to the data after May 2011 by calculating the change in the mean and standard deviation.

Interpretation

Table 4 shows:

1. The mean of the flow has been reduced by 15 percent, and the standard deviation, which is an indication of the range in flows, has been reduced by 37 percent as a result of the toe drain repairs.

2. The means of the chemistry parameters show an increase in concentrations as a result of the decrease in flow, except for nitrate, which had a decrease of 43 percent.

3. The means of ammonia and COD have increased by 111 and 93 percent, respectively, which are the largest increases of any of the parameters.

4. Stormwater should have a high concentration of dissolved oxygen, which allows for the chemical oxidation of ammonia and COD and, thus, removal of some portion of these constituents from the water. With the reduction of stormwater flow, the oxidation reaction is presumably not as prevalent and, therefore, there is a disproportional increase of ammonia and COD compared to most of the other parameters.

5. With less dissolved oxygen from the stormwater, there is less ammonia converted to nitrate, so a decrease (negative number in Table 4 of -43 percent) in nitrate is expected.

6. The standard deviations of the concentrations of key parameters, except for nitrate, have increased.

7. The increase in the mean and standard deviation for total dissolved solids is nearly the same as the decrease in the mean and standard deviation for the flow.

Conclusions

1. As stated in previous reports, DZ-8 is impacted by leachate; therefore, with a reduction of stormwater flow there is less dilution, and the concentrations of dissolved parameters have increased.

2. Depending on the magnitude and timing of various stormwater events, and the lag time for leachate to enter the detection zone, it is possible that the DZ-8 water quality could approach the water quality of the overlying leachate collection system at the time the leachate and leachate detection zone samples are collected.

3. Based on the statistical data presented, the leachate impact on DZ-8 has increased with the reduction of stormwater flow, and the ranges in concentrations have increased significantly, except for nitrate, as indicated by the standard deviations.

Chemistry in Wells Downgradient of DZ-8 Area – July 2015

There are three monitoring wells, BL-2Ds, BL-2Dd, and BL-6D, and three abatement wells, AB-8, AB-9, and AB-10, that are downgradient of the DZ-8 area. The analytical results from these wells generally show either stabilized chemistry or decreasing trends in chemistry, except for the sodium and chloride and the resulting specific conductivity in BL-2Ds, which are from deicing at the site. Thus, there is no obvious indication that the water quality in the wells downgradient of DZ-8 has been adversely impacted by the flow in DZ-8.

Groundwater Collection System – July 2015

The three downgradient abatement or groundwater collection wells, AB-8, AB-9, and AB-10, are within 50 feet of the downgradient edge of DZ-8. The pumping of these wells forms a trough or low area in the groundwater flow system, so that they intercept groundwater that flows beneath the DZ-8 area. The three abatement wells, however, were installed because of the unlined waste area upgradient of DZ-8, and the water quality in the groundwater in the area of the recovery wells has improved since the system has been installed. The pumps continue to operate on a regular basis.

OVERALL CONCLUSIONS

The following represents a summary of the key conclusions of the DZ-6, DZ-7, and DZ-8 (Phase III Area) detection zone flows that have been investigated and evaluated in four previous reports and this sixth report. The fifth report by MM did not include any water evaluation.

1. The flows in DZ-6 and DZ-7 have been well below 100 g/ac/d for approximately 6 years as a result of the capping and other measures performed in 2008 and 2009. PADEP requires an investigation when flows exceed 100 g/ac/d.

2. The increased pumping from the abatement wells beginning in 2006 has created a more effective groundwater trough downgradient of the Phase III area.

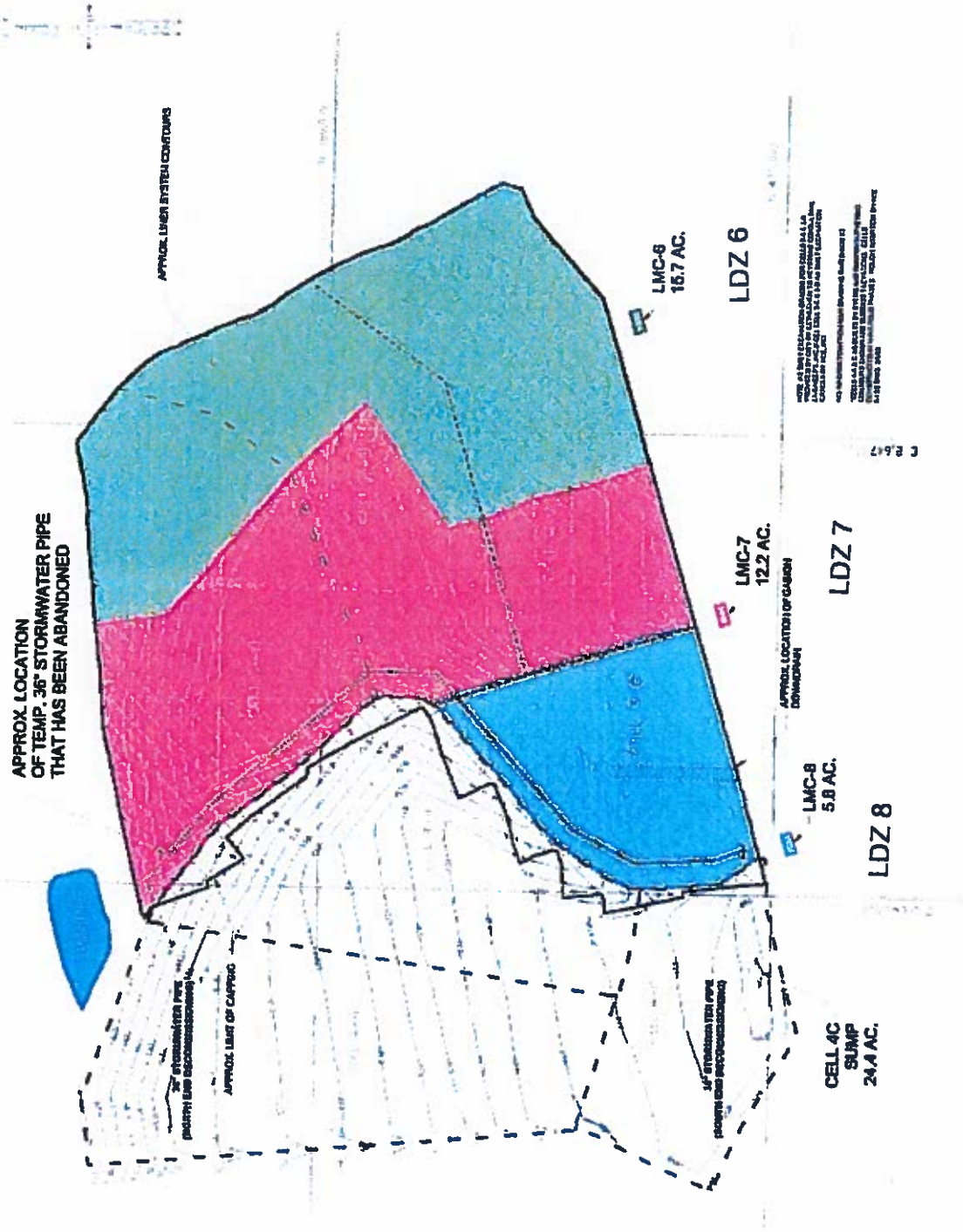
3. The monitoring wells downgradient of the abatement well groundwater trough are in compliance with municipal waste landfill groundwater abatement standards.

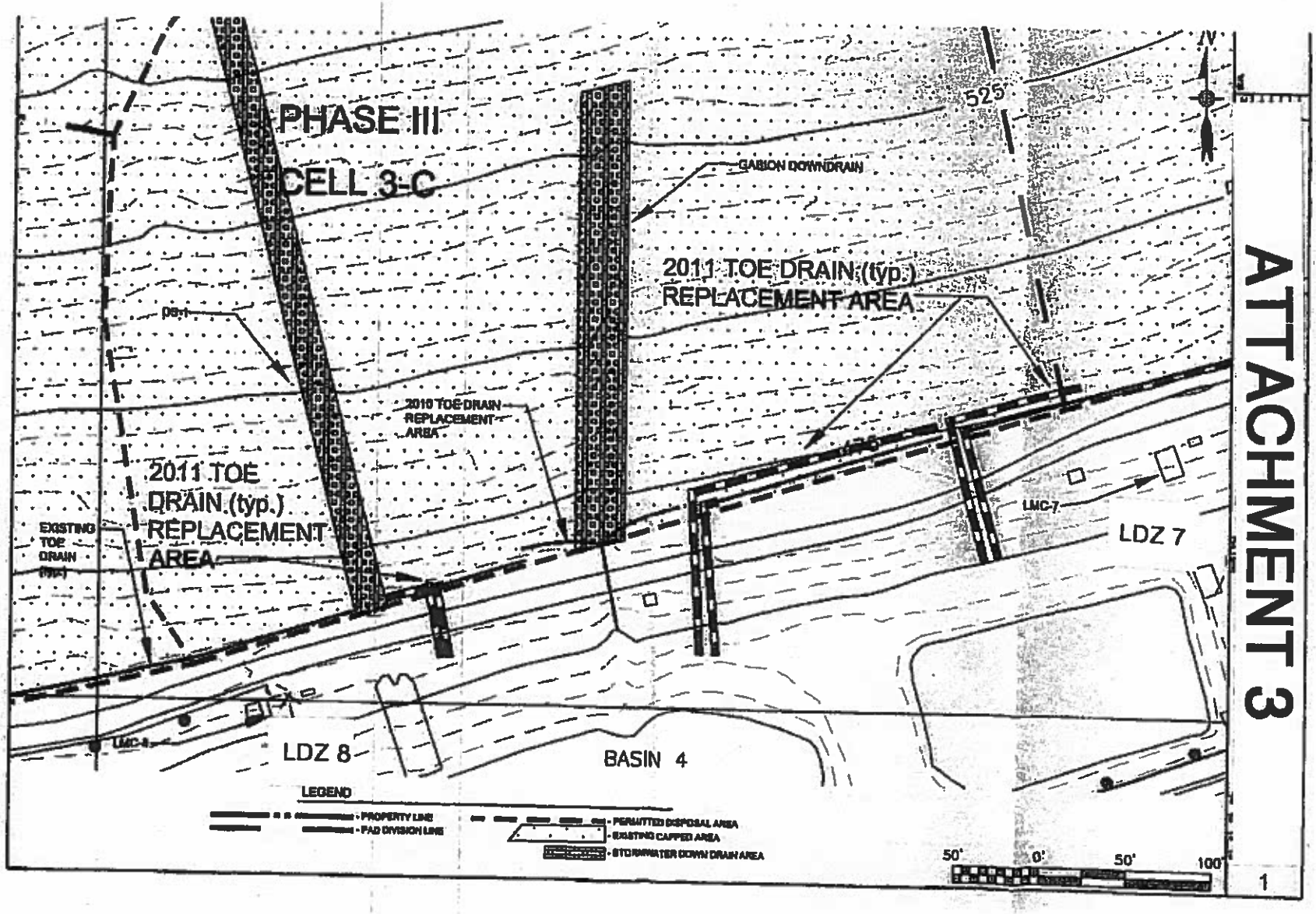
4. After the improvements to the toe drain in the area of DZ-8 were completed on April 4, 2010 and May 8, 2011, the flow rates in DZ-8 were reduced, which resulted in a proportional increase in the concentration of total dissolved solids in DZ-8.

5. The elevated flow rates in DZ-8 are from stormwater, not from leachate in the overlying LC-8 system.

6. There is no obvious indication that the water quality in the wells downgradient of DZ-8 has been adversely impacted by the flow in DZ-8.

ATTACHMENT 2





ATTACHMENT 3

1

General Business & Developer

Lower Saucon Township
Council Agenda

October 3, 2012
7:00 p.m.

I. OPENING
- A. Call to Order
- B. Roll Call
- C. Pledge of Allegiance
- D. Announcement of Executive Session (if applicable)

II. PUBLIC COMMENT PROCEDURE

III. PRESENTATIONS/HEARINGS
- A. Resolution #66-2012 – Honoring Resident Minnie Poulton's 105th Birthday

IV. DEVELOPER ITEMS

V. TOWNSHIP BUSINESS ITEMS
- A. Report on Landfill Concerns
- B. IESI Permit Renewal Application Comments
- C. Kingston Park Update
- D. Update on Repairs to Old Mill Bridge

VI. MISCELLANEOUS BUSINESS ITEMS
- A. Approval of September 19, 2012 Minutes

VII. PUBLIC COMMENT/CITIZEN NON-AGENDA ITEMS

VIII. COUNCIL & STAFF REPORTS
- A. Township Manager
- B. Council/Jr. Council Member
- C. Solicitor
- D. Engineer
- E. Planner

IX. ADJOURNMENT

Next EAC Meeting: October 9, 2012
Next Saucon Valley Partnership: November 14 @ LST
Next Zoning Hearing Board Meeting: October 15, 2012
Next Council Meeting: October 17, 2012
Next Planning Commission Meeting: October 25, 2012
Next Park & Rec Meeting: November 5, 2012

www.lowersauconotownship.org

ATTACHMENT 4

WHEREAS, when Minnie was attending Broughal High School in Southside Bethlehem she was run over by a car on Wyandotte Hill, during a time when there were very few cars on the roads; and

WHEREAS, Minnie's worked most of her life in local silk and dress mills; and

WHEREAS, Minnie was married to Harold C. Poulton when she was 22 years old and they were married for 59 years before Harold passed away shortly before their 60th anniversary; and

WHEREAS, Minnie and Harold have a daughter, Joan, born in 1930 and a son, Harold E., born in 1942; and

WHEREAS, Minnie, who is now a resident of the Mary Ellen Convalescent Home, likes to recite poems and stories, including a Christmas story and the story of the landing of the Pilgrims; and

WHEREAS, Minnie always enjoyed traveling to visit her 6 grandchildren, 15 great-grandchildren and 2 great-great-grandchildren.

MOTION BY: Mr. Horiszny moved for approval of Resolution #66-2012.
SECOND BY: Mrs. deLeon
Mr. Kern asked if anyone had any comments. No one raised their hand.
ROLL CALL: 5-0

IV. DEVELOPER ITEMS – None

V. TOWNSHIP BUSINESS ITEMS

A. REPORT ON LANDFILL CONCERNS

Mr. Kern said the Township Landfill Consultants, representatives from PA DEP and from the IESI Bethlehem Landfill will respond to the list of health, safety and welfare concerns that have been expressed to Council and the Planning Commission by residents regarding the operation of the landfill.

Councilmen Maxfield several meetings ago suggested this as a course of action, and that's why we're here tonight. The purpose of tonight is to separate fact from fiction and see what the main concerns are.

Mr. Birdsall introduced everyone around the table. Present were:

- Bill Tomayko, who is with DEP. He's in charge of the waste management division of the party. They oversee the regulations and permitting of landfills. Jeff Spade is also present who is an employee of the DEP.
- Lauressa McNamar, Special Landfill Consultant to LST regarding all aspects of the operation.
- Rich Sichler, Geologist and Special Consultant to LST for primarily the groundwater aspects, the monitoring and geology.
- Jim Birdsall, Township Engineer representative who coordinates consultant reviews and watches over site planning.
- Christopher Taylor, Host Municipal Inspector to the landfill.
- Mary Ann Garber, IESI Counsel.
- Sam Donato, District Manager at IESI
- Al Schleyer, Plant Manager from the landfill.
- Rick Bodner, Engineer from Martin & Martin to the landfill.

Mr. Birdsall said anticipating this meeting and reviewing the questions of the consultant group for the Township, the group decided it would be most efficient to break the questions into subject

matter. We'd like to cover the following areas and there will always be room for questions in the end:

- Stormwater management and Mr. Birdsall will take care of that presentation.
- Landfill construction concerns and Lauressa will be handling that.
- Air quality and gas management concerns and Lauressa will be handling that.
- Groundwater quality concerns and that would be Rich Sichler.
- Ongoing role of residents, IESI, the Township and the State on various subjects. Mr. Birdsall will try to handle most of those.
- Time for additional questions.
- There may be some issues where they will refer to Chris Taylor who is the HMI for the Township on the site on a regular basis.

Mr. Birdsall said he will start on stormwater management, to give a little background for those folks who may not be familiar with how a landfill was designed. The stormwater management aspect of the landfill is very much regulated by a various State laws and overseen by the Department of Environmental Protection (DEP) directly from the Wilkes-Barre office. Some of the projects are handled from an erosion standpoint by the County Conservation District. The County Conservation District is not really involved when the State is involved in a landfill of this nature, but the landfill still must receive approvals from the State, the Township for stormwater management and also from the Lehigh Valley Planning Commission (LVPC) for stormwater aspects of the plan. Stormwater management at the landfill is designed back at the early stages. The biggest issue we want to explain this evening is that anything that falls on the open landfill where there's garbage being placed, any rain or snow that falls in the landfill, is kept within that landfill with a fabric liner underneath the landfill and Lauressa will explain the liner. It's like a cup where any rain that falls into that cup, stays in that cup. Anything outside that cup may run off. It may run off during the construction of some of the access roads and areas that aren't landfill. As the landfill gets completed and capped, the runoff from the ground on top of the landfill will go back into the normal channels of stormwater runoff. There are two modes of rain. One is into the middle of the landfill and it's caught into the cup; and the other rain falls off and goes into the normal water courses where it gets reabsorbed into the ground. For that rain that leaves the site, that's regulated also. It goes through detention and control basins before it leaves the site so that it's actually regulated through a series of orifices before it leaves the site. That basin configuration and the orifices and the management of that water, not only regulates rain, but the basins are designed to allow some sediment to drop out because there may be soil particles that come off the side slopes when the basins are too full. There have been some complaints about muddy water leaving the site. We have observed that condition and we do know that it happens for the most part as the water is actually pretty clear of sediment that leaves the site, especially when it's not heavy. There are incidents and times when it does leave the site and what they have observed is a little milkiness in the water, and some of the discharge points which indicates suspended sediment leaving the site. No worse than a normal construction activity and we believe the sediment basins are working properly and discharging at a rate that is acceptable and a quality that is acceptable. By physical observation, we did not detect any smell or odor or any color. There was color raised by some of the citizens. We did not detect a color that is anything different than the milkiness resulting from sediment. That doesn't mean we saw what they saw. There may have been an incident in any of these cases of a citizen claim. There may be a situation where an incident would occur. We have not observed anything like that which would indicate a polluted runoff leaving the site.

Mr. Birdsall said with regard to the next item of concern, whether or not the stormwaters are affecting well water quality. He'll address a little bit of that and then will ask Rich Sichler to also address that question as he's more familiar with groundwater contamination. The rain that falls in the cup doesn't leave, so it doesn't contaminate underground water. The water that leaves and goes into a basin, some of that may get absorbed into the ground, but to the greatest degree, that water

Mr. Birdsall said no. Mr. Maxfield said he can tell you from talking to people at County Conservation and some State agencies, there is one section of the Saucon Creek that is considered high quality where trout breed and that is close to Saucon Park. The other areas are considered to be of high quality, not of exceptional quality, not as high as that. He hasn't heard any designations for those other areas as far as fish breeding.

Ms. Nicolette Stavrovsky said she did come in late, but she's sure it has been brought up about the smell. They live a mile and a tenth in from the Freemansburg Bridge. We don't even smell the sewage plant, but they smell the dump. She just doesn't understand that. Mr. Kern said they will be addressing that later.

Ernest Stavrovsky said if you would have an expansion, he's sure you have in the permits, you would probably have allowances for the leachate and stuff, and he knows it's very toxic. Are there plans for a treatment plant, a preliminary plant there or just a holding tank? He knows a couple of times the pump station down below in the City of Bethlehem has had a lot of problems because of the leachate coming in there and having to go in, and if you had to work on the pumps down there, it's just so bad, you are going in with Scott air packs and everything else. Are there provisions for that? Mr. Kern said Mr. Tomayko will go over the leachate requirements for existing and any potential future. Mr. Tomayko said leachate is the waste water that comes out of the garbage. From the landfill, it's collected through a designed collection system routed to storage tanks and the landfill has a permit to discharge that leachate to the public sewer lines that convey it to the City of Bethlehem treatment plant at the end of Applebutter Road. That's the permitted operation and that's what they do.

Mr. Birdsall said the new topic is landfill construction concerns. Ms. Lauressa McNemar said the million dollar question is what is the life of a liner and the potential for leaking? She doesn't think any of us want to answer that question definitively, but the design of the system at the IESI landfill is a state-of-the-art facility using the best available technology with what's on the market for a double liner system. You refer to it as a fabric, which is a pervious substance. The likelihood for a leak in such a liner system like this is more related to how it is installed and if there is mechanical damage to the liner system during installation or during filling operations. The system itself is expected to last for the life of the facility as long as it produces leachate. Once the facility is capped, there's no more rain that falls into the cup, and there's no more leachate produced so that the leachate is not sitting on the bottom against the liner and you don't have that active degradation and chemicals in contact with liner like you do when you have the active liner. Back in the very early days of designing landfills when DEP was first putting together the regulations, they had something called the EPA 50/50 test which actually took these liner materials and submerged them in the worst chemical constituents that you could find and they monitored it and checked the strength and that's how they came up with the current regulations which are very strict and what the qualities need to be. In addition to that, there's a performance criteria that is defined in the regulations that not only do you have to have specific features of the design system, but they have to perform to contain the leachate and collect it and put it to its ultimate treatment facility which is the City of Bethlehem. Those performance standards need to be met the entire operating life of the facility and for the post-closure period. After that, there is something that happens with the site and there are provisions on the State level and there are bonding and post-closure funds that are available by three different groups who address problems that occur after that. That takes away the scare that it's like a swimming pool liner because it's not.

Mr. Maxfield said again to summarize, there was a statement made at one of our meetings, and he'd like you to characterize this. The bottom line is when you put a liner under a landfill, it's expected that the liner is going to leak. Are you saying it's not expected to leak? Ms. McNemar said correct, it's expected that it's not going to leak. Mr. Maxfield said then it's opposite of that statement, thank you. Ms. McNemar said do things happen, yes things do happen. This could be due to installations or something to do with mechanical. She was at a site once that a piece of

equipment accidently gouged it during installation. It was readily identified and reburied. Those are the kind of things that would happen to the liner itself. The detection zone liner system is geared towards making sure there the primary liner is intact and that is it performing properly.

Mr. Kern said would you say that the most critical period would be when the liner is first laid and the first layer of material is placed in there? Ms. McNemar said yes, there are specific provisions for the first 8' of trash that are placed on top of the liner. They cannot have sharp objects and pieces of material that exceed certain maximum dimensions. From her understanding, IESI works this way. They inspect all those loads when they first go on top of the liner by hand and there have been instances where something has been found in the pest, and that happens, but the point is it was caught and there are a lot of checks and balances. Mr. Kern said in the worst case scenario, something doesn't get caught and it pierces the liner, how would it be detected and how soon would it be detected or would it be detected? Ms. McNemar said it could not be detected at all. There are strict requirements for the puncture resistance of the liner material that includes the weight of the fill on top of it, and that's how these things are designed. Should that happen, then the detection zone, the leachate would go through the primary liner into the detection zone and you would pick up flow in the detection zone that may indicate that there is a breach in the primary liner. That's the purpose for it. Mr. Kern said initially it would most likely be detected if there was a breach and it would be at a level where it could be repaired fairly easily? Ms. McNemar said not necessarily. Sometimes it takes years for something to show up like that and the operations of a landfill require them to identify where every load was dumped on the grid basis so that if they have been out of the ordinary load, sharp objects from demolition debris or something that was a suspect, it would show an increased flow within a couple of weeks that is was placed and that would be a flag. In most cases you would only see a spike if it was related to a specific instant right at the ground level during installation. Mr. Mayfield said last meeting Mr. Birdsall was before us and he talked about the existing leachate leakage that is occurring. He said it was being caught in the secondary zone and was being treated and there was no way it was entering into the water system or anything like that. Would that also be your assessment? Ms. McNemar said there has been flow in this leachate section since the year 2000, many, many years. The DEP has policies and guidelines that identify when it gets over a certain level, and then they are going to require some action to be taken and find out what the source of that flow is. Since that time, they had IESI do some various investigations to find out and determine the source of that and it has up-to-date contributed to infiltration of stormwater and a seam that is getting into the liner system rather than leachate that's coming through the front of the liner. She will tell you that she reviewed the second quarter facility report today and every quarterly report has a chemical analysis of the leachate itself and water that's in the detection zone so that you would be able to tell if the water in the detection zone is cleaner, the chemical analysis would be somewhat different. This last quarterly report, and she would like to bring this to Bill's attention, the chemical analysis for the detection zone water and the collection zone water were virtually identical which to her indicates that perhaps it's more than stormwater going on there. That's just a supposition at this point. She doesn't have the details; she just looked at the chemical results. It happened one time before in the last year and a half where the chemical analysis was just balanced and your first thought is it's not stormwater down there, it's leachate, so maybe something else is going on. Her understanding is that Council sent a letter with this concern and it is a concern as you don't want to be here ten years from now still talking about the flow of the leachate in the detection zone if it continues. That is a concern. Mrs. deLeon said what section of the landfill is it? Ms. McNemar said it seems to be emanating from the Phase III area and it's shown up in the leachate management chamber no. 8. She said there was a concern about as the landfill gets bigger, and maybe it was just a statement, but there's more leachate and there's more gas, the bigger it gets, the worse it gets. The theory of the landfill is as you cap it, you stop the rainwater from coming in. You stop the degradation process to a point and the waste cap stabilizes. Mr. Kern asked what does stabilizes mean? Ms. McNemar said it's a landfill term. She can't say it's not going to generate gas or leachate, but it exists by itself without having to manage gas emissions because it's not producing enough gas, and where it's not producing leachate that has to be pumped away. As a landfill progresses the ground surface, the

new areas that have rainfall are going to be producing leachate to a higher level in those areas than are capped. As it flows, you have a pretty well producing non-stabilized area that is still under operations and then in the end, the perfect picture is once it's closed, as long as there's no oxygen in there, you aren't going to get that kind of decay you are getting now. Mr. Kern said what is the decay period once it's capped? Ms. McNemar said she doesn't know the answer to that.

Mr. Tomayko said there are a lot of factors that are involved in it so there's no straight answer that he can give you. He can tell you that once the landfill is closed and completely capped, the gas generation drops off quickly, but it doesn't ever stop. You end up with a curve that drops off rather steeply in a relatively short period of time. Then it flattens out and goes on for decades and continues to generate gas. The most active point of gas generation is during the active life of the landfill. Mrs. deLeon said who is going to talk about bonding? She knows a lot of residents have said to her about what's going to happen post-closure. Is there enough money that's set aside, and her answer is there's bonding set aside. How many years do they have to bond? Mr. Tomayko said the laws require the landfill to maintain the bond as long as they have liability. Mrs. deLeon said that could be beyond thirty years then? Mr. Tomayko said that's correct. As long as they are producing leachate that needs to be treated, as long as they have gas that needs to be collected and destroyed or used, as long as they have obligations they need to meet or regulations they need to meet, they need to maintain a bond. Mr. Maxfield said no walking away from the problem? Mr. Tomayko said that's right. Mrs. deLeon said that's happened in the past with other landfills. Mr. Tomayko said they have the bond. We have that financial incentive so they don't walk away. If they do walk away, then we have the ability to take care of the issue. That's the purpose of the bond.

Ms. McNemar said there was another concern whether the site was designed to be able to handle earthquake situation. The answer is yes. The design of the facility, there is an earthquake analysis that's done on different cross sections of the landfill at the maximum height to make sure it could withstand an earthquake scenario. In addition to that, when they construct the cells, they need to verify some of the field parameters that they've assumed that are in the earthquake analysis. She's sure the analysis is sound.

Ms. McNemar said another question was what if something hazardous gets into the landfill even though there's a waste acceptance plan and there's all kinds of checks and balances to make sure from the generator standpoint to the disposal standpoint, that there are no hazardous waste that make it to the landfill. There are things that we do throw out in our trash that are considered hazardous. The design of a sanitary landfill liner system in PA is the same criteria used to design a hazardous waste landfill. The double liner system, the leachate collection system, the leachate detection system, the level of permeability of those liners is virtually identical with a few differences from the hazardous waste landfills. DEP made these regulations just for that reason. That's the end of some of these design questions.

Mr. Kern said let's give IESI an opportunity to discuss anything that was discussed here. Mr. Rick Bodner said it was well done. He'd like to describe what a liner is because it's not just a liner, it's a system. Let him start at the bottom of the system and work up to where the trash is. You get to excavation grade and then place 6" of compacted clay soil. The first construction effort is placing clay and that is tested for density and permeability to make sure it's requisite low permeability soil. Directly on top of that is the secondary liner, the plastic, high density polyethylene that Lauressa mentioned. That's the secondary or lower level liner system. On top of that is the flow detection system. It can be sand. It can be geotech, a high permeability material. The purpose of this is to pick up any waters that get to it from the overlying primary liner and carry those to the detection sump where you can see what flow and what chemistry you may be capturing in that secondary liner system. Above that, and this is new, he thinks happened in the early 2000's, DEP requires a bentonite, which is a clay that swells substantially when it gets wet. On top of the detection zone and below the primary liner, the upper most plastic of polyethylene membrane is a layer of

bentonite clay. On top of that is the primary liner. On top of that is a cushion and geotech style to protect that primary liner from the 18" of flow zone materials, sandy material, a high permeability sand. That is directly placed on top of the upper most liner. On top of that 18" is where the first layer of trash goes as Lauressa mentioned. It's called the fluff layer, and that's the layer that is inspected as each load is dumped and spread to make sure there's nothing that will potentially get vertical and penetrate through the liner system. When you say the landfill has a liner, it's merely a system and maybe the neatest thing about the system today is that the layer of bentonite is beneath the primary liner. In the industry, we've all seen this demonstration where you take a liner with a layer of bentonite beneath it and you can pound a nail through it which is not an easy task. You can force a nail through the high density polyethylene liner and you can watch the water work through the hole you just created and watch the clay swell up and seal a hole. In addition to all the safety that was built into the liner system, the subsequent additional requirements of this bentonite layer is just a super duper band aid to be put in place. When we talk about landfills having liners, that's what a liner is. Lauressa is correct; we analyze the mass for earthquakes. It has the ability to sustain itself through an earthquake and not only do we look at the liner system in the landfill, but we also have to analyze the cap that goes on top of it. Because of your temperature, your landfill is like a big bowl of jelly and the bowl the jelly is sitting in, the liner system is capped and we want the membrane cap on top of that jelly has to be able to sustain itself through an earthquake. All of that is evaluated and the design will be modified until they have a bowl of jelly and a stable bowl with a good cap on top of it that can sustain an earthquake. Mrs. deLeon said you heard us talk about the leachate management chamber 8 which is a big concern of her, and he's done some work in the toe drains trying to find why and each time she sees the chart and sees that it exceeds the gallons per day, that's a violation of a DEP reg. Mr. Bodner said it's not a violation of the regs, it's a trigger in the reg. What it does is it triggers things a landfill must do if that trigger is exceeded. Lauressa is right where there are times when C-8, the leachate detection flows from a portion of the Phase III cell exceeds that 100 gallons per acre per day. Bethlehem is doing everything that the regulations require it to do to deal with that situation. It handles that flow as well as it treats it as though it were leachate. In addition, this landfill and all landfills have perimeter monitoring to see if the landfill is leaking, and is it affecting the water table. We just checked to see not too many weeks ago, and asked if there was any landfill in PA where the liner has failed with leakage to the liner system and the answer is no. There is no leakage from the liner system, no failure. Going the next step, although not required by the trigger that he just mentioned in the regulations, the cause of the old City of Bethlehem landfill and its impacts on groundwater, there is a new system in place in Bethlehem and is operated so that groundwater flow from the hillside going to the south is captured, pumped and handled as leachate. If this were a different site at a different location, without that pump, that is a potential system that might have to be put in, although the issues at Bethlehem don't require them to put it in based on what's happening there now. Fortunately for everyone, it is there now.

Mrs. deLeon said let's not confuse the abatement system with the pump and the leachate management system chamber 8 and 7 sometimes, but 8 more importantly. What are you going to be doing to help fix that? Mr. Bodner said as you know we have done remedial work and it has had a positive impact and they are continuing to look for possibilities as to where that stormwater is getting into the detection zone. We are continuing to look for areas and as we identify them, we address them and we've been somewhat successful, but not completely successful.

Mr. Kern said can you elaborate on what that issue is? Mr. Bodner said what it appears is that there's stormwater as it's very much precipitation related, there are spikes in flow in the detection zone is directly related to stormwater to rainfall events. There is stormwater sometimes getting into the envelope between the primary liner and the secondary liner. The detection zone is probably, and this is where we focus our attention, is probably at the anchor trench because these liners just come out of the ground, go down into an anchor trench where they are anchored. It appears thus far the efforts we've implemented have been aimed in this direction and have been somewhat successful in cutting off that water from getting it into the anchor trench. It is stormwater that is

somehow getting into the system between the secondary liner and the primary liner. Mr. Kern said it's being introduced not at the trash level, the stormwater is getting in between liner levels. Mr. Bodner said at the perimeter of the landfill, at the anchor. Mr. Kern said it's not leachate, it's stormwater? Mr. Bodner said yes, it is stormwater. Mrs. deLeon said she disagrees because Lauressa just said in the second quarter, which was being reviewed by our staff that the parameters are showing that it's leachate. Mr. Bodner said he heard Lauressa say that. Mrs. deLeon said it's your report. Mr. Bodner said their analysis has been and continues to be stormwater. Mrs. deLeon said every time we see a monthly meeting, she always asks if there is anything in the reports we should know about. To her, this is significant that the second quarter report showed these findings and at the monthly meetings we weren't notified. That's why we have monthly meetings.

Mr. Al Schleyer said what is reported is some of their investigative report and the findings from their geologist noted as the flows decrease in the detection zones during a dryer condition where there's a lot of rainfall, it reduces the flowing. When things are sampled in those conditions, the water chemistry is more concentrated.

Ms. McNemar said take a closer look at that report. In that particular report, the flow was 92 acres per day which is higher. The chemistry was significantly different than the previous report.

Mr. Maxfield said to Mr. Bodner that they have been somewhat successful in treating that, what does that mean exactly? Mr. Bodner said we have cut down on the gallon per acre, per day. They are not as high as they had previously been. Mr. Maxfield said significant? Mr. Bodner said yes, significant.

Mr. Kern said how much of an issue is this for public health and safety on a scale of one to ten where ten is red alert and one is no big deal, this issue we've been just discussing? Ms. McNemar said she guess it would depend if the flow in the detection zone gets past the detection zone, then it may or may not be an issue. Right now there is flow in the detection zone. It is not drinking water standards. It appears to be very different than if you were to sample stormwater from on the top of the mountain. It's an indication there is, and she'll use the word, malfunction, whether and how it was constructed on the side or some kind of anchor trench or where stormwater or what have you is in the detection zone. The detection zone functions for a purpose of raising a flag if there is something going on; so there's a flag raised. If it goes beyond that, the flows have been low this year because there hasn't been a lot of rain and that's why flows are down. If flows start to pick up in the 300 to 400 gallon a day range, it will be interesting to see in the next two weeks, and the problem is still there and it's as bad as it was five years ago. She won't say it's as bad as five years ago. There have been improvements. Is it a health problem? You go by what Rick says, is you have your perimeter groundwater monitoring system, the public risk would be if it gets into the ground water and people would be drinking the ground water, which they are not as they have public water, then it would be to the next level, but at this point it seems to be contained within the system itself.

Mrs. deLeon said she hears what you are saying that it's contained within the landfill property if you drew a straight line all the way down to the center of the earth, it's there, but to her, she's just saying someone says the pollution didn't go offsite, it stayed within the landfill, don't worry about it, that's unacceptable. It's still pollution and she doesn't know if she wants to give this a ten, but it's definitely a red flag and she takes it seriously as it's not supposed to be there. It's not supposed to be there. Mr. Maxfield said did he misunderstand? He thought the statement was that it stayed within the system, not within the landfill boundaries. Mrs. deLeon said she's making a comparison. Mr. Maxfield said he's just saying it's being treated and it's not contaminating anything even on landfill property. Mr. Bodner said when he described the liner system; it's within the liner system as opposed to within the landfill property. It's where it belongs.

Mr. Tomayko said the question he heard is, is this issue a public health and safety issue and he's not aware of any public health and safety issue related to this particular problem. It's common to have flow in between these layers. It's common for landfill operators to do what IESI is doing. In fact, as has been stated, the regulations say you need to monitor that flow as far as the quantity and its chemistry. IESI is doing that. When the flow reaches certain levels, it triggers investigation to reduce it and find out if it is a problem and that's what's going on now. There are no pollutants or concerns escaping the landfill and affecting people's health or public safety. He would give it a zero.

Mr. Matt McClarin said tell him if he's wrong, but we have a lined landfill next to an unlined landfill. Where does all the water go from the unlined landfill and is it actually polluting the groundwater and what aspect is in place to protect the citizens in place who do have well water surrounding the landfill from that groundwater being contaminated and getting into the water table from that part? There are strict things for the liners, but we still have an unlined landfill next to it leaking leachate into the ground. What are the safety precautions that DEP requires for that with neighboring wells and properties located within a mile of the property and what is being done to pump that water out? Mr. Rich Sichler said there are active controls in place. There's an abatement system that actively pumps water out from downgrading flotation from the unlined older portion of the landfill system. Those cells, since IESI has been on site have been capped, reduced rainfall flowing through that, and hopefully reducing the amount of impact water that reaches the groundwater. Below the abatement system, we have our monitoring network that tests the water that would be leaving that area to see if we have any impacts that would have any related environmental or health concerns. With upgraded, that landfill was state-of-the-art at some time, and now as much as can be done to mitigate and bring it up to today's standards. You have a monitoring system to see if those remedial activities are effective and if there still are impacts. Mr. McClarin said is there any chance that water could be getting into our wells around the neighborhood or into the water table that we're actually drinking and bathing our kids in and anything else? He just wants to suggest to LST, this had been kept in the dark for a lot of people with homes and he knows they are real stringent about testing wells and stuff. He'd suggest to end all of this right now and see if the water is contaminated as we have no idea if IESI or LST or DEP could please, if we could get our own person to test our own wells or anybody else that has one and make sure there is no contamination in them. Mr. Kern said the initial question is, is there a possibility that the unlined landfill water runoff could be somewhat contaminating the wells? Mr. Sichler said there would be to directions to approach that. One direction that is typically taken is to do a hydro-geologic study to determine what groundwater has been in place rather than to do shotgun samples or widespread sampling of wells. That has been done on numerous occasions where everything is evaluated and re-evaluated and constantly looked at on an annual basis to see if the system that is in place is effective. The monitoring system has been designed to detect the extent of water or be in place in case there is a release that has not been detected prior to it reaching any private water supplies, public water supplies or surface water. That is designed by the operator, reviewed by the Township and DEP professionals and ultimately approved by DEP, so there are a number of checks and balances in the system that we have. That would be the approach rather than just the routine sampling of wells. They probably would be included in the monitoring program.

Mr. Birdsall said when the City of Bethlehem was operating that landfill, the downstream wells did indicate some pollution and in his opinion, and in the opinion of the other experts in the Township, there was some pollutant leaving the site immediately adjacent to the landfill on the south side. That was one of the reasons why the operator of the landfill, and ultimately, IESI, had to design the system that actually pumps out the groundwater from underneath the landfill in what's as known as the abatement system. It pumps it into a pipe that goes directly into the City of Bethlehem waste water treatment plant, so there's thousands of gallons a day being drawn out of the ground to take away any water that gets into the landfill and immediately beyond that, there's a ring of wells that are called monitoring wells. Monitoring wells are not only on the south side, but they are also on

BETHLEHEM LANDFILL
T RAIN EVENT INSPECTION

DATE: ESTIMATED RAINFALL: _____

INSPECTOR:

ROAD MAINTENANCE

ROAD	MAINTENANCE NEEDED			REPAIRS NEEDED
	WATERED	SWEPT	WASHED	
Loop @ scale area				
Paved Entrance				
Haul road to East/North				
Applebutter Road				
Perimeter Berm				

LEACHATE SEEPS	PRESENT		SEEP DESCRIPTION SCHEDULE FOR REPAIRS
	YES	NO	
1. West slope			
2. South slope			
3. North slope			

NOTES: ANY LEACHATE SEEP FLOWING OFF THE LANDFILL MUST BE CORRECTED IMMEDIATELY.

EROSION Slopes/Benches	EROSION		TRASH EXPOSED		DISCHARGE ISSUES	DESCRIPTION SCHEDULED REPAIRS
	YES	NO	YES	NO		
1. North Slope by shop						
2. North Slope Cell 4F						
3. South Slope East of Flare						
4. South Slope West of Flare						
5. West Slope						

BASINS, PIPES & CHANNELS	EROSION		ACCUMULATED SEDIMENT		DISCHARGE ISSUES	DESCRIPTION SCHEDULED REPAIRS
	YES	NO	YES	NO		
Basin 1						
Basin 2						
Basin 3						
Basin 4						
Basin 6						

ANCHOR TRENCH - DRAINS FLOWING &/OR UNOBSTRUCTED?

	FLOWING		UNOBSTRUCTED		DESCRIPTION SCHEDULED REPAIRS
	YES	NO	YES	NO	
SOUTH PERIMETER TOE DRAINS					

ATTACHMENT 5

Attachment 10

KEY / LEGEND

- LIMIT OF ORIGINAL LANDFILL PHASE I AND PHASE II DISPOSAL AREAS
- LIMIT OF DISPOSAL PHASE III (DOUBLE LINER)
- LIMIT OF DISPOSAL PHASE IV (DOUBLE LINER)
- CELL DIVISION
- ADJOINING PROPERTY LINE
- LANDFILL PROPERTY LINE (224 ACRE CONSOLIDATED DEED)
- DEP PERMIT BOUNDARY AS TAKEN FROM MARCH 1994 PERMIT DRAWINGS
- PP&L POWER LINE
- EASEMENT LINE
- RIGHT OF WAY LINE
- BUILDING RESTRICTION LINE (B.R.L.)
- 660 — EX. OR PREVIOUSLY APPROVED CONTOURS
- 700 — PROPOSED CONTOURS
- OVERHEAD UTILITY POLE
- FENCE
- WETLAND AREAS
- RIPARIAN CORRIDOR BUFFER
- STREAM PROTECTION EASEMENT
- WOOD LINES, TREE MASSES
- LANDFILL WOODLAND EASEMENT
- WOODFILL AREA
- SOUTHEASTERN REALIGNMENT - MSE BERM
- SOUTHEASTERN REALIGNMENT - ACCESS ROAD
- SOUTHEASTERN REALIGNMENT - AREA OF DEVELOPMENT
- SOUTHEASTERN REALIGNMENT - CELL DIVISION
- SOUTHEASTERN REALIGNMENT - LIMIT OF DISPOSAL
- CHANNEL ℄ (EXISTING OR PREVIOUSLY APPROVED)
- CHANNEL ℄ (PROPOSED)
- CULVERT (EXISTING OR PREVIOUSLY APPROVED)
- CULVERT (PROPOSED)
- INLET (EXISTING OR PREVIOUSLY APPROVED)
- INLET (PROPOSED)
- MANHOLE (EXISTING OR PREVIOUSLY APPROVED)
- MANHOLE (PROPOSED)
- BENCH (PROPOSED)
- SLOPE DRAIN (EXISTING OR PREVIOUSLY APPROVED)
- SLOPE DRAIN (PROPOSED)
- WOODLAND PROTECTION FENCING
- PROPOSED EDGE OF WOODLANDS

N

PROPOSED EDGE OF WOODLANDS (SEE SHEET 18 OF 18 FOR DETAILS)

SUPPLEMENTAL PLANTING SCREEN PLANTINGS (SEE SHEET 18 OF 18 FOR DETAILS

CELL SE2-A

PHASE II (SINGLE LINER)

61 LANDSCAPE TREES (SEE SHEET 18 OF 18 FOR DETAILS)

CHANNEL M

CHANNEL N

COVENANT AREA / NO WASTE TO BE PLACED WITHIN THIS AREA (SEE SHEET 9 OF 18 FOR DETAIL)

PROPOSED LIMIT OF DISPOSAL

PROPOSED MSE WALL

LIMIT OF PROPOSED MSE WALL

FLOW

50' BUFFER YARD

PROPOSED EDGE OF WOODLANDS (SEE SHEET 18 OF 18 FOR DETAILS)

300' SETBACK FROM EX. BUILDINGS

100' LANDFILL ACTIVITY SETBACK

WOODLAND PROTECTION FENCING (TYP.)

PHASE I (DOUBLE LINER)

LIMIT OF PROPOSED MSE WALL

TIE CHANNEL "N" TO EX. PERIMETER CHANNEL

ACCESS ROAD

15' ACCESS ROAD

BASIN 2

BASIN 2 TEMP. RISER (TO BE RELOCATED)

EMERGENCY SPILLWAY EL. 476.75

CITIZEN DROP OFF AREA

BASIN 2 SCREENING (SEE SHEET 17 OF 18 FOR DETAILS)

BASIN 2 OUTLET BARREL (TO REMAIN)

SOUTHEASTERN REALIGNMENT AREA OF DEVELOPMENT

WETLAND C

RETAINING WALL

NEW GUIDERAIL THIS SECTION

EX. ACCESS ROAD

WETLAND G

LMC-2

LMC-3

LMC-4

N/F Andrew J. & Jennifer Nuss 861-281

N/F J. & Severn 300-003 35 /1/

N/F H. B.

50' BUFFER YARD

DETAILED GRADING & LANDSCAPE PLAN (1"=50')

LOWER SAUCON TWP.

PRELIMINARY / FINAL LAND DEVELOPMENT PLAN & SITE PLAN

PA Bethlehem Landfill Corp.

PENNSYLVANIA

EVASI

		0/1	
Apr	01/23/15	Revised per DEP Comments	03
Mar	08/17/15		03
			05/03/1

martin and martin incorporated
37 south main street • suite A
chambersburg, pennsylvania . 17201
phone: (717) 264-6759

PROJ. NO. 1162.3
DES. BY: JM
DWG. BY: 08
CHK. BY: RMB
SCALE: 0 50' 100' 200' Scale: 1" = 50'

C D FILE: 62.3-LDP-012.13.dwg

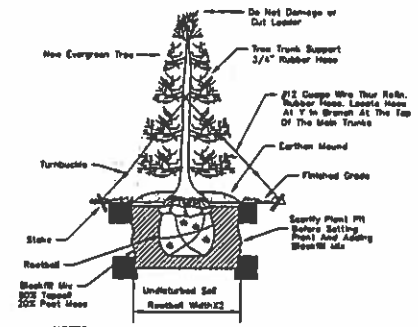
D 08/17/15

1" = 50'

NG NO.

12 of 18

FILE: 1162.3 (INDEPENDENT SE-EXPANSION) 1162.3-LDP-012.13.dwg

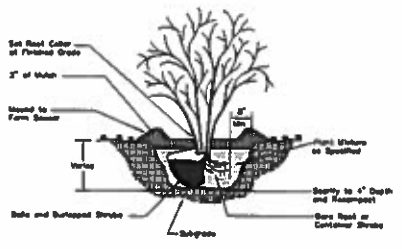


NOTES:

1) This Method to To Be Used On All 6' Or Taller Evergreen Plant Materials
2) Fertilizer With 0-20-0 (Clay Soil) 20-10-5 Or 16-8-16 (Sandy Soil) Before Mulching (1lb./Dia. Ft Of Soil)
3) No Soil or Mulch Shall be in Contact with the Trunks of Trees or Branches of Shrubs

EVERGREEN TREE PLANTING DETAIL

N.T.S.

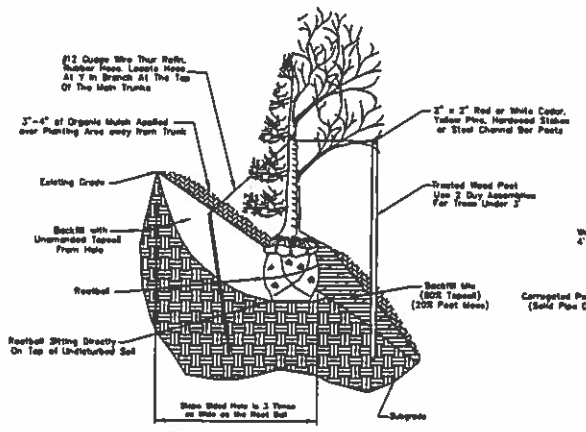


NOTES:

1) Do Not Prune Evergreens Except to Remove Dead or Broken Branches.
2) Thin Branches and Foliage (Not At Branch Tips) By 1/3 Retaining Normal Plant Shape (Except Evergreens).
3) Remove Burlap From Top 1/3 of Ball, or With Container Plants, Remove or Split Container as Specified.
4) No Soil or Mulch Shall be in Contact with the Trunks of Trees or Branches of Shrubs.

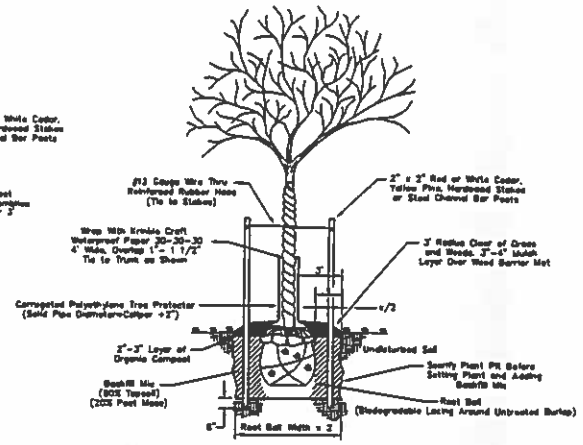
SHRUB PLANTING - (SINGLE)

N.T.S.



STEEP SLOPE TREE PLANTING DETAIL

N.T.S.



NOTES:

1) Fertilize With 0-20-0 (Clay Soil) 20-10-5 or 16-8-16 (Sandy Soil) Before Mulching (1 lb./Dia. Ft. of Soil)
2) Tree Trunk Flare shall be 0 or Slightly Above Grade
3) No Soil or Mulch Shall be in Contact with the Trunks of Trees or Branches of Shrubs

TREE PLANTING DETAIL

N.T.S.

PLANT SCHEDULE 50' PLANTING SCREEN

TREES	QTY	BOTANICAL NAME / COMMON NAME	CONT
AR	8	Acer rubrum / Red Maple	1 1/2" Caliper B&B
IO	31	Ilex opaca / American Holly	5' B&B
JV	26	Juniperus virginiana / Eastern Red Cedar	5' Ht. Container
OV	8	Ostrya virginiana / American Hophornbeam	1 1/2" Caliper B&B
PS	44	Pinus strobus / White Pine	5' Ht. B&B
PS	4	Prunus serotina / Black Cherry	1 1/2" Caliper B&B
QR	4	Quercus rubra / Red Oak	1 1/2" Caliper B&B
SHRUBS	**QTY**	**BOTANICAL NAME / COMMON NAME**	**SIZE**
IG	32	Ilex glabra / Inkberry Holly	36" Ht Cont.
VP	32	Viburnum prunifolium / Blackhaw Viburnum	36" Ht Cont.

PLANT SCHEDULE 15' EDGE PLANTING

TREES	QTY	BOTANICAL NAME / COMMON NAME	CONT
CC	25	Cercis canadensis / Eastern Redbud Multi-trunk	1 1/2" Caliper B&B
IO	32	Ilex opaca / American Holly	5' B&B
JV	43	Juniperus virginiana / Eastern Red Cedar	5' Ht. Container
OV	43	Ostrya virginiana / American Hophornbeam	1 1/2" Caliper B&B
SHRUBS	**QTY**	**BOTANICAL NAME / COMMON NAME**	**SIZE**
VW	42	Viburnum cassinoides / Witherod Viburnum	36" Ht Cont.
VP	45	Viburnum prunifolium / Blackhaw Viburnum	36" Ht Cont.

PLANT SCHEDULE FILL

TREES	QTY	BOTANICAL NAME / COMMON NAME	CONT
AR	9	Acer rubrum / Red Maple	1 1/2" Caliper B&B
CC	3	Cercis canadensis / Eastern Redbud Multi-trunk	1 1/2" Caliper B&B
LT	3	Liriodendron tulipifera / Tulip Tree	1 1/2" Caliper B&B
NS	8	Nyssa sylvatica / Black Gum	1 1/2" Caliper B&B
OV	9	Ostrya virginiana / American Hophornbeam	1 1/2" Caliper B&B
PS	10	Pinus strobus / White Pine	5' Ht. B&B
PS	9	Prunus serotina / Black Cherry	1 1/2" Caliper B&B
QR	9	Quercus rubra / Red Oak	1 1/2" Caliper B&B
TO	9	Thuja occidentalis / Eastern Cedar	5' Ht. B&B

PLANT SCHEDULE SUPPLEMENTAL TREE PLANTING

TREES	QTY	BOTANICAL NAME / COMMON NAME	CONT
CC	8	Cercis canadensis / Eastern Redbud Multi-trunk	1 1/2" Caliper B&B
OV	8	Ostrya virginiana / American Hophornbeam	1 1/2" Caliper B&B
PS	8	Pinus strobus / White Pine	5' Ht. B&B

PLANT SCHEDULE BASIN 2 SCREEN

TREES	QTY	BOTANICAL NAME / COMMON NAME	CONT
AR	4	Acer rubrum / Red Maple	1 1/2" Caliper B&B
CC	2	Cercis canadensis / Eastern Redbud Multi-trunk	1 1/2" Caliper B&B
IO	2	Ilex opaca / American Holly	5' B&B
JV	17	Juniperus virginiana / Eastern Red Cedar	5' Ht. Container
OV	7	Ostrya virginiana / American Hophornbeam	1 1/2" Caliper B&B
PS	13	Pinus strobus / White Pine	5' Ht. B&B
PS	1	Prunus serotina / Black Cherry	1 1/2" Caliper B&B
QR	3	Quercus rubra / Red Oak	1 1/2" Caliper B&B
TO	4	Thuja occidentalis / Eastern Cedar	5' Ht. B&B
SHRUBS	**QTY**	**BOTANICAL NAME / COMMON NAME**	**SIZE**
VW	8	Viburnum cassinoides / Witherod Viburnum	36" Ht Cont.
VP	21	Viburnum prunifolium / Blackhaw Viburnum	36" Ht Cont.

LANDSCAPING NOTES:

SITE LANDSCAPING

THE EXISTING IMPERVIOUS SURFACE WITHIN THE SUBJECT PROPERTY IS 41.8 AC. THE DEVELOPMENT REALIGNMENT PROPOSES AN ADDITIONAL 6.70 AC. OF 29,401 SF OF NEW IMPERVIOUS SURFACE AS REQUIRED BY ORDINANCE ONE TREE PER EACH 500 S.F. OF NEW IMPERVIOUS SURFACE IS REQUIRED. 1,402 (+) TREES ARE REQUIRED. AS SHOWN ON THE LANDSCAPING PLANS A SERIES OF TREES ARE PROPOSED ON THE FILL SLOPE ALONG THE SOUTHERN BOUNDARY TO MEET THIS REQUIREMENT. TREES PLANTED WITHIN THIS AREA SHALL BE A MIX OF NATIVE SPECIES APPROVED BY THE TOWNSHIP DIRECTOR OF COMMUNITY DEVELOPMENT.

REMOVAL OF DEBRIS

ALL STUMPS AND OTHER TREE PARTS, LITTER, BRUSH, WEEDS, EXCESS OR SCRAP BUILDING MATERIALS OR OTHER DEBRIS SHALL BE REMOVED FROM THE PLANTING SCREEN AREA/BUFFER YARD AND DISPOSED OF IN ACCORDANCE WITH TOWNSHIP REGULATIONS. NO TREE STUMPS, OR PORTIONS OF TREE TRUNKS OR LIMBS SHALL BE BURIED ANYWHERE WITHIN THE PLANTING SCREEN AREA/BUFFER YARD. IF TREES AND LIMBS ARE REDUCED TO CHIPS, THEY MAY BE USED AS MULCH IN THE PLANTING SCREEN AREA ONLY UPON APPROVAL BY THE TOWNSHIP DIRECTOR OF COMMUNITY DEVELOPMENT.

SLOPE PLANTINGS

LANDSCAPING OF ALL CUTS AND FILLS SHALL BE SUFFICIENT TO PREVENT EROSION AND ALL EMBANKMENT SLOPES STEEPER THAN ONE (1) FOOT VERTICAL TO TWO (2) FEET HORIZONTAL SHALL BE PLANTED WITH SUITABLE GROUND COVER IN ACCORDANCE WITH THE PENN STATE AGRONOMY GUIDE. SAID GROUND COVER SHALL INCLUDE ERYONG SATIVA (50 lbs/ac), ANNUAL WINTER WHEAT (120 lbs/ac), OR WINTER RYE (112 lbs/ac). THE BASE MIXTURE IS AUGMENTED WITH CREEPING FESCUE (90 lbs/ac), TALL FESCUE (30 lbs/ac), AND BIRDSFOOT (3 lbs/ac).

INSTALLATION AND MAINTENANCE

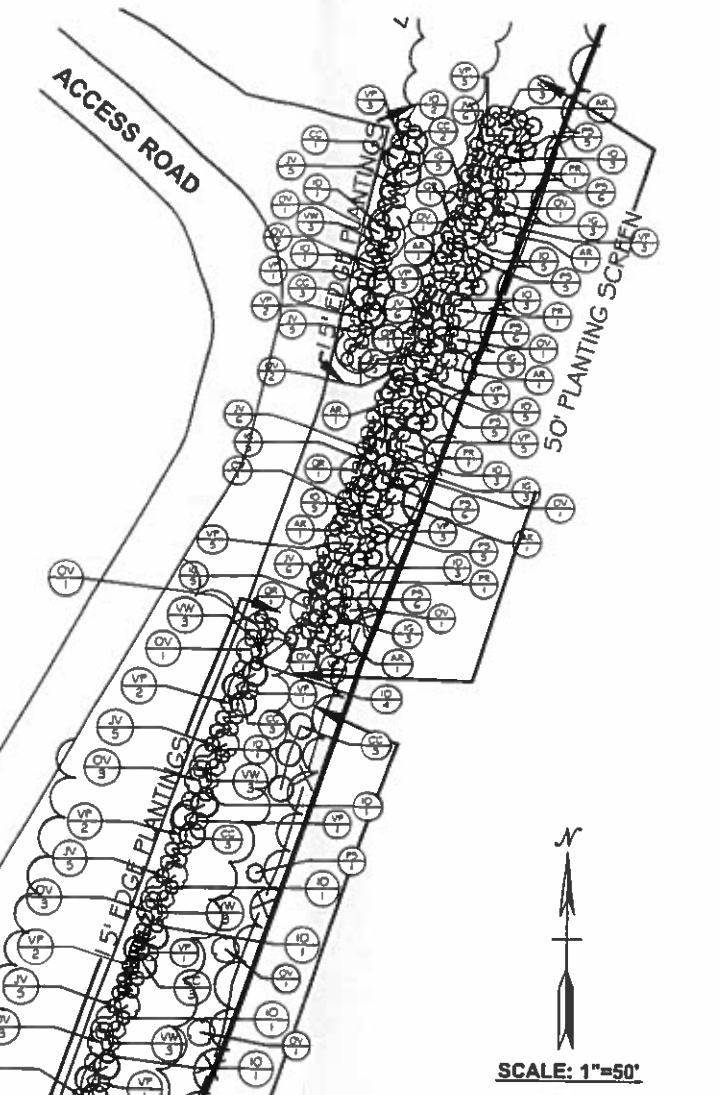
ALL PLANTING MATERIALS REQUIRED SHALL BE FURNISHED BY ICR. INSTALLED IN A GOOD WORKMANSHIP LIKE MANNER AND IN ACCORDANCE WITH ACCEPTED AND GOOD PLANTING PROCEDURES AND MAINTAINED BY ICR IN ACCORDANCE WITH GOOD STANDARDS. PLANTINGS SHALL BE OF HEALTHY STOCK AND SHALL BE WATERED REGULARLY BY ICR AND BY A SPRINKLER SYSTEM WHERE PROVIDED. ICR SHALL GUARANTEE ALL PLANTINGS FOR TWO SEASONS, WHICH SHALL INCLUDE ONE (1) FULL GROWING SEASON, AND REPLACE THEM TO THE SATISFACTION OF THE TOWNSHIP ENGINEER OR OTHER TOWNSHIP OFFICIAL AS MAY BE DESIGNATED BY TOWNSHIP ORDINANCE, DURING THE NEXT GROWING SEASON. NO BUILDING, STRUCTURE OR STORAGE OF MATERIALS OR PARKING SHALL BE PERMITTED WITHIN THE PLANTING SCREEN AREA. THE PLANTING SCREEN AREA SHALL BE MAINTAINED BY ICR SO AS TO PRESENT A HEALTHY, NEAT AND ORDERLY APPEARANCE AND SHALL BE KEPT FREE OF ALL DEBRIS & RUBBISH. PLANTINGS SHALL BE AS PER THE APPROVED LAND DEVELOPMENT PLAN. ANY SUBSTITUTIONS SHALL BE APPROVED IN WRITING BY THE TOWNSHIP DIRECTOR OF COMMUNITY DEVELOPMENT PRIOR TO INSTALLATION BY ICR.

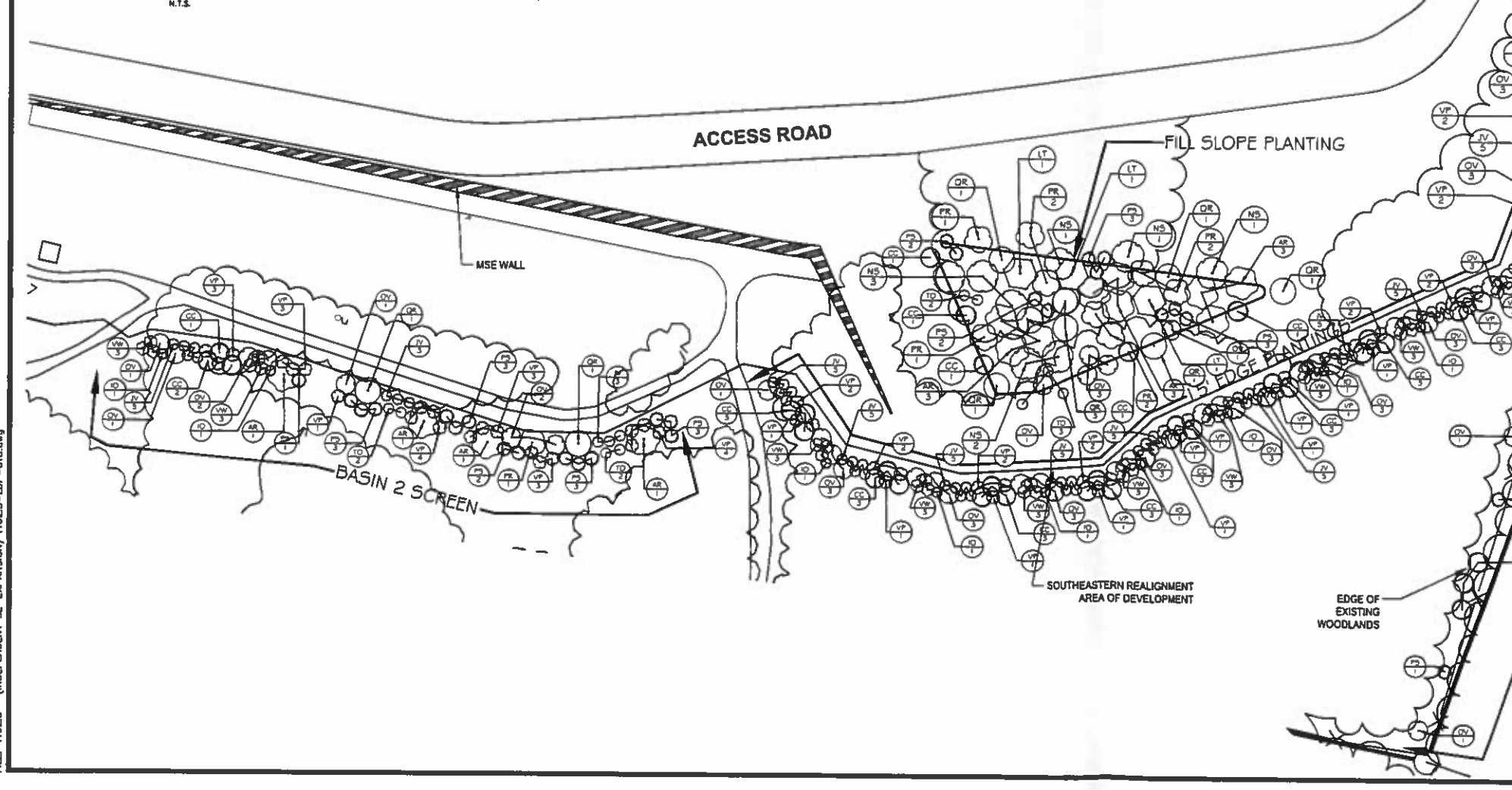
GUYING AND STAKING

GUYS OR STAKES SHALL BE SECURED TO THE TREE USING A HOSE THROUGH A HOSE AND ATTACHING THE GUY OF STAKE WIRES AT THAT POINT. BARE WIRE SHALL NOT BE USED. TREES UP TO THREE (3) INCHES IN DIAMETER MAY BE SUPPORTED BY STAKES. MOVABLE TREES OF LARGER SIZE SHALL REQUIRE GUY WIRES. NORMAL ATTACHMENT IS AT THIRD-POINTS THE HEIGHT OF THE TREE. TO AVOID GIRDLING THE TREE, GUYS AND STAKES SHOULD BE REMOVED AFTER ONE YEAR OR EARLIER IF THE BIND CAUSES DAMAGE.

MULCHING

ALL PLANTINGS SHALL BE MULCHED THOROUGHLY WITH FOUR (4) INCHES OF WOOD CHIPS. MULCH SHALL BE MAINTAINED IN SOME CONDITION BY ICR FOR A MINIMUM OF ONE (1) YEAR AFTER PLANTING





STREET TREE NOTES & CALCULATIONS

1. As depicted on Sheet 9 of 18, the Southeastern Realignment proposes no impact to existing trees and vegetation along the Applebutter Road and Skyline Drive rights-of-way.

2. The total length of roads in frontage (Applebutter Road) for the IESI PA Bethlehem Landfill property is 5,000 feet. Section 145-52.B of the Zoning Ordinance would require the planting of one (1) street tree for every 100 feet of roadway frontage (for a total of 50 street trees), if existing trees along Applebutter Road were not retained. The existing trees and vegetation along Applebutter Rd that are being retained exceed the 50 street trees that would be required under Section 145-52.B of the Zoning Ordinance.

3. The total length of roads in frontage (Skyline Drive) for the IESI PA Bethlehem Landfill property is 5400 feet. Section 145-52.B of the Zoning Ordinance would require the planting of one (1) street tree for every 100 feet of roads in frontage (for a total of 5 more) trees, if existing trees along Skyline drive were not retained. The existing trees and vegetation along Skyline Drive that are being retained exceed the 5 trees that would be required under Section 145-52.B of the Zoning Ordinance.

BUFFER YARD NOTES

NOTES:

1) BUFFER YARD PLANTING SCREEN LANDSCAPE MATERIAL SHALL BE UTILIZED WHERE EXISTING ENCLOSED COVER INCLUDING SHRUB, BRUSH, AND TREES DOES NOT SERVE AS A BARRIER TO VISIBILITY, GLARE AND NOISE AS REQUIRED.

2) REPLACE TREES AS NECESSARY IF DISTURBED DURING CONSTRUCTION.

3) ALL PLANTINGS SHALL BE LOCATED APPROXIMATELY 10 FEET FROM ALL WATER LINES. THE FINAL LOCATIONS SHALL BE COORDINATED BY ICR WITH THE LOWER SAUCON AUTHORITY.

4) SUBSTITUTION OF ANY OTHER SPECIES SHALL BE APPROVED IN WRITING BY THE TOWNSHIP DIRECTOR OF COMMUNITY DEVELOPMENT.

NO.	REVISION	DATE
1	As Per Twp's. 1st Review Comments	10/12/15
2	Rev. per 12/16/15 Review Letter	12/30/15
3	As Per 01/21/16 Review Letter	01/27/16
4	Revised Landscape Maintenance Notes	05/03/16

LANDSCAPING NOTES & DETAILS

LOWER SAUCON TWP. — NORTHAMPTON CO.

PRELIMINARY / FINAL LAND DEVELOPMENT PLAN & SITE PLAN

IESI PA Bethlehem Landfill Corp.

PERMIT#100434

martin and martin incorporated
37 south main street suite A
chambersburg, pennsylvania 17201
phone: (717) 264-6759

PROJ. NO. 1162.3 | DES. BY: DB | CHK. BY: JJ | DWG. BY: RMG

SCALE: AS NOTED

CADD FILE: 1162.3-LDP-018.dwg

DATE: 08/17/15

SCALE: AS NOTED

DRAWING NO. 18 of 18

FILE: 1162.3 (INDEPENDENT SE-EXPANSION) 1162.3-LDP-018.dwg

Attachment 11

IESI PA BETHLEHEM LANDFILL
SOUTHEASTERN REALIGNMENT
PCSM PLAN STORMWATER VOLUME ANALYSIS CALCULATION
NOVEMBER 11, 2016

2-Yr/24-Hr Volume Analysis

The Southeastern Realignment at the IESI PA Bethlehem Landfill proposes a lateral expansion of newly lined disposal area on +/-6 acres. Of this acreage, 3.75 acres is virgin ground, while 2.25 acres is comprised of previously disturbed acreage for material stockpiles in support of the current landfill operation. (See attached mapping "Post Construction Land Cover Mapping") Therefore, the total area of land cover change as part of the Southeastern Realignment is 3.75 acres. This virgin area has both woodland and assumed meadow land cover with underlying Hydraulic Soil Group B Soils. Thus, a pre-development runoff volume for the 2-year/24-hour event from the 3.75 acres is 3,706 cubic feet. This is based upon curve numbers of 55 for woodlands and 58 for meadow. Refer to attached Worksheet #4 for more details and calculation.

Under post development conditions, the 3.75 acres will consist of open space grass cover, access roads and landfill footprint. The citizen drop-off area west of Basin #2 will be converted back to grass cover under post development conditions. Curve numbers for these land covers are 98 for access roads, 85 for capped landfill and 61 for grass open space. The vast majority of the analysis acreage (3.27 acres) is outside the landfill footprint and is effectively tie-in areas or slopes extending from the landfill anchor trench to existing grade.

Calculations yield a post development 2 yr/24 hr event runoff of 8,018 cf. Taking the post development volume (8,018 cf) minus the pre-development volume (3,706 cf) results in a volume increase for the 2-yr./24-hr. event of 4,312 cubic feet. Refer to Worksheet #4, attached.

At the Department's request, IESI PA Bethlehem Landfill proposes to permanently retain this volume increase (4,312 cubic feet) of runoff onsite by implementation of two (2) BMPs. These include revegetation/reforestation and placement of soil amendments.

Revegetation/Reforest

As a part of the Township approved Land Development Plan for this project, IESI proposes to develop 189 deciduous trees and 243 evergreen trees as revegetation/reforest measures at the southeast corner of

the site. As per the BMP Manual, each evergreen tree accounts for 10 cubic feet of volume reduction while each deciduous tree accounts for 6 cubic feet of volume reduction. Thus, the total volume reduction associated with the revegetation is 3,564 cubic feet. The Pa BMP Manual guidelines for revegetation recommend only 25% of a volume increase to be mitigated by this BMP. Therefore, the volume reduction for placement of trees provides for 1,078 cubic feet or 25% of the volume increase.

Soil Amendments

IESI also proposes to place soil amendments in certain areas onsite to provide additional volume reduction. These areas are identified on the plan attached and represent the floor areas of each post construction stormwater basin. The total floor area of Basins 1, 2, 3, 4 & 6 is 1.9 acres. Placement of soil amendments within the bottom floor area of each basin will result in a volume reduction calculated as follows:

82,764 cf (1.9 Ac.) x 0.50 in. x 1/12 = 3,448 cubic feet

The soil amendments will be placed within the basins during landfill closure activities. Thus, the Closure Plan - Form 28 of the Solid Waste Application will contain this requirement, plus the specifications for material and placement of the soil amendments.

Conclusion

As presented on the mapping attached, the proposed landfill expansion will result in land cover changes impacting 3.75 acres of virgin ground. Calculations outlined on Standard Worksheet #4 yield a 4,312 cubic foot increase in volume for the 2 year / 24 hour storm event from the 3.75 acre impacted area. Implementation of BMPs as shown on the attached plans shall serve to permanently remove/retain the associated 2-yr./24-hr. volume increase onsite. In total 1,078 cubic feet will be removed/retained by revegetation and 3,448 cubic feet from Soil Amendment placement for a total reduction of 4,526 cubic feet which is greater than the calculated volume increase (4,312 cf) resulting from the project.

NPDES Post-Construction Stormwater Worksheet 4

; Post-Construction Stormwater Worksheet 4

Project Name: IESI Pa Bethlehem Landfill - Southeastern Realignment
Project Location: IESI Pa Bethlehem Landfill
Date Prepared: 11/11/16
Martin and Martin File#: 1162.30

2-year/24 hour rain event = 3.08 inches

EXISTING CONDITIONS

COVER TYPE/CONDITION	SOIL TYPE	AREA (sf)	Area (ac)	CN	S	Ia (0.2*S)	Q (runoff) (in)	Runoff Volume (ft^3)	Runoff Volume (ac-ft)
Meadow	B	108,900	2.50	58	7.2	1.45	0.30	2,723	0.063
Woodlands	B	54,450	1.25	55	8.2	1.64	0.22	982	0.023
TOTAL		163,350	3.75				0.52	3,706	0.085

DEVELOPED CONDITIONS

COVER TYPE/CONDITION	SOIL TYPE	AREA (sf)	Area (ac)	CN	S	Ia (0.2*S)	Q (runoff) (in)	Runoff Volume (ft^3)	Runoff Volume (ac-ft)
Open Space (Good)		142,441	3.27	61	6.4	1.28	0.40	4,700	0.108
Capped Landfill		16,553	0.38	85	1.8	0.35	1.66	2,284	0.052
Impervious		4,356	0.10	98	0.2	0.04	2.85	1,034	0.024
TOTAL		163,350	3.75				4.90	8,018	0.184

INITIAL CHANGE IN RUNOFF VOLUME (POST-PRE)

CONDITION	Runoff Volume (ft^3)	Runoff Volume (ac-ft)
EXISTING CONDITIONS	3,706	0.085
DEVELOPED CONDITIONS	8,018	0.184
INITIAL CHANGE IN RUNOFF VOLUME	4,312	0.099

VOLUME INFILTRATED BY STRUCTURAL BMPs

BMP NAME	Runoff Volume (ft^3)	Runoff Volume (ac-ft)
Revegetate/Reforest	1,078	0.025
Soil Amendments	3,448	0.079
VOLUME INFILTRATED BY PCSWM BMPs	4,526	0.104

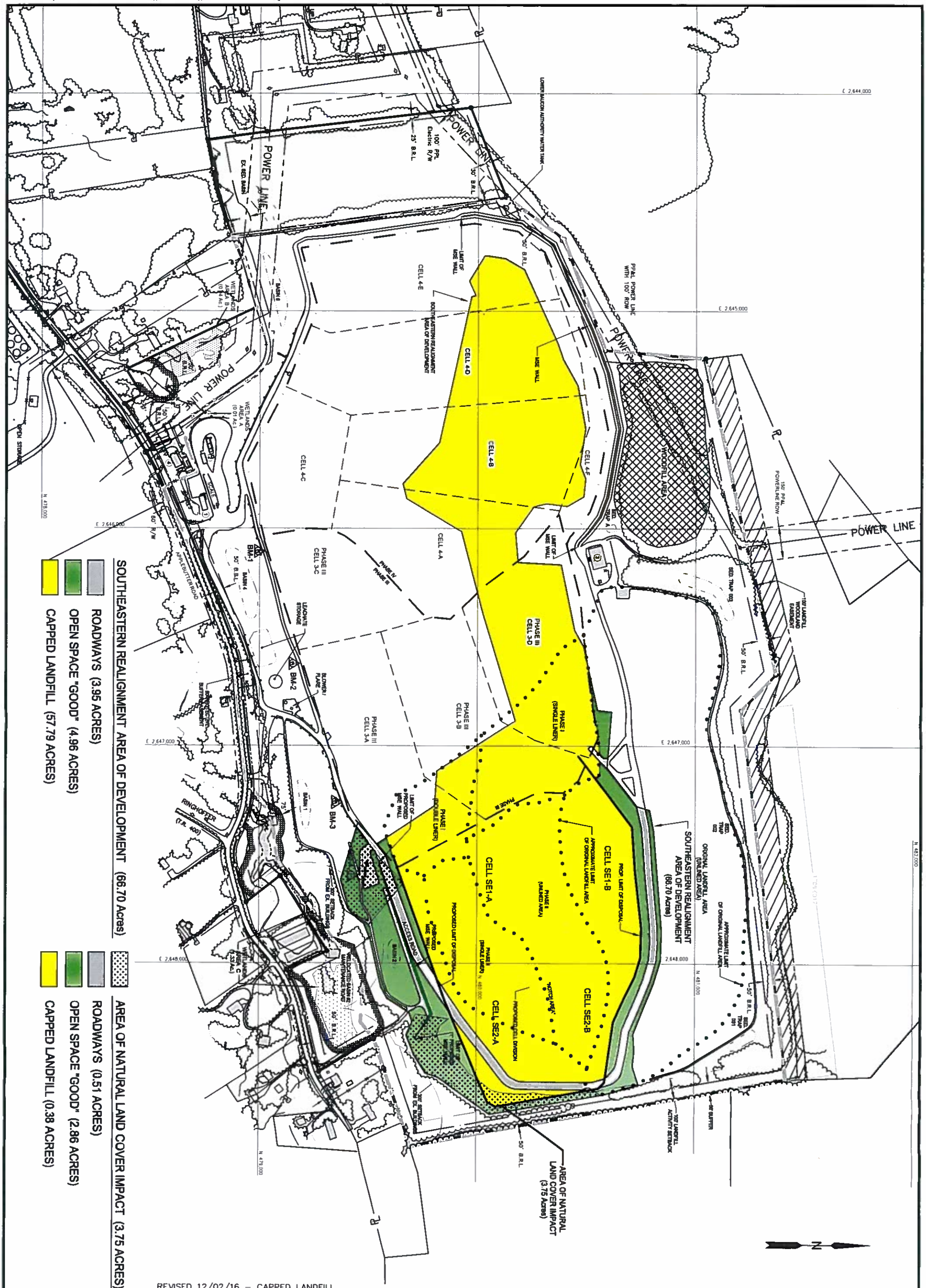
NON-STRUCTURAL BMP VOLUME CREDITS

	Runoff Volume (ft^3)	Runoff Volume (ac-ft)
CHANGE IN RUNOFF VOLUME	4,312	0.099
NON-STRUCTURAL VOLUME CREDITS	0	0.000
NET CHANGE IN RUNOFF VOLUME	4,312	0.099

TOTAL NET CHANGE IN RUNOFF VOLUME

	Runoff Volume (ft^3)	Runoff Volume (ac-ft)
NET CHANGE IN RUNOFF VOLUME	4,312	0.099
VOLUME INFILTRATED BY PCSWM BMPs	4,526	0.104
TOTAL NET CHANGE IN RUNOFF VOLUME	*-214*	-0.005

FILE: 1162.3 (INDEPENDENT SE-EXPANSION)/WaterQuality/1162.3 PostDevWQ.dwg



SOUTHEASTERN REALIGNMENT AREA OF DEVELOPMENT (66.70 Acres)

ROADWAYS (3.95 ACRES)

OPEN SPACE "GOOD" (4.96 ACRES)

CAPPED LANDFILL (57.79 ACRES)

AREA OF NATURAL LAND COVER IMPACT (3.75 ACRES)

ROADWAYS (0.51 ACRES)

OPEN SPACE "GOOD" (2.86 ACRES)

CAPPED LANDFILL (0.38 ACRES)

REVISED 12/02/16 – CAPPED LANDFILL

martin and martin incorporated
37 south main street • suite A
chambersburg, pennsylvania . 17201
phone: (717) 264-6759

POST DEVELOPMENT LAND COVER PLAN

LOWER SAUCON TWP. NORTHAMPTON CO.

PA Bethlehem Landfill Corp.
A Progressive Waste Solutions Company
PENNSYLVANIA

Scale: 1"=400'
Job # 1162.3
Date: 11/19/15
By: EW/DB
Chk'd: JM

KEY / LEGEND

- LIMIT OF ORIGINAL LANDFILL PHASE I AND PHASE II DISPOSAL AREAS
- LIMIT OF DISPOSAL PHASE III (DOUBLE LINER)
- LIMIT OF DISPOSAL PHASE IV (DOUBLE LINER)
- CELL DIVISION
- ADJOINING PROPERTY LINE
- LANDFILL PROPERTY LINE (224 ACRE CONSOLIDATED DEED)
- DEP PERMIT BOUNDARY AS TAKEN FROM MARCH 1994 PERMIT DRAWINGS
- PP&L POWER LINE
- POWER LINE R/W
- BUILDING RESTRICTION LINE (B.R.L.)

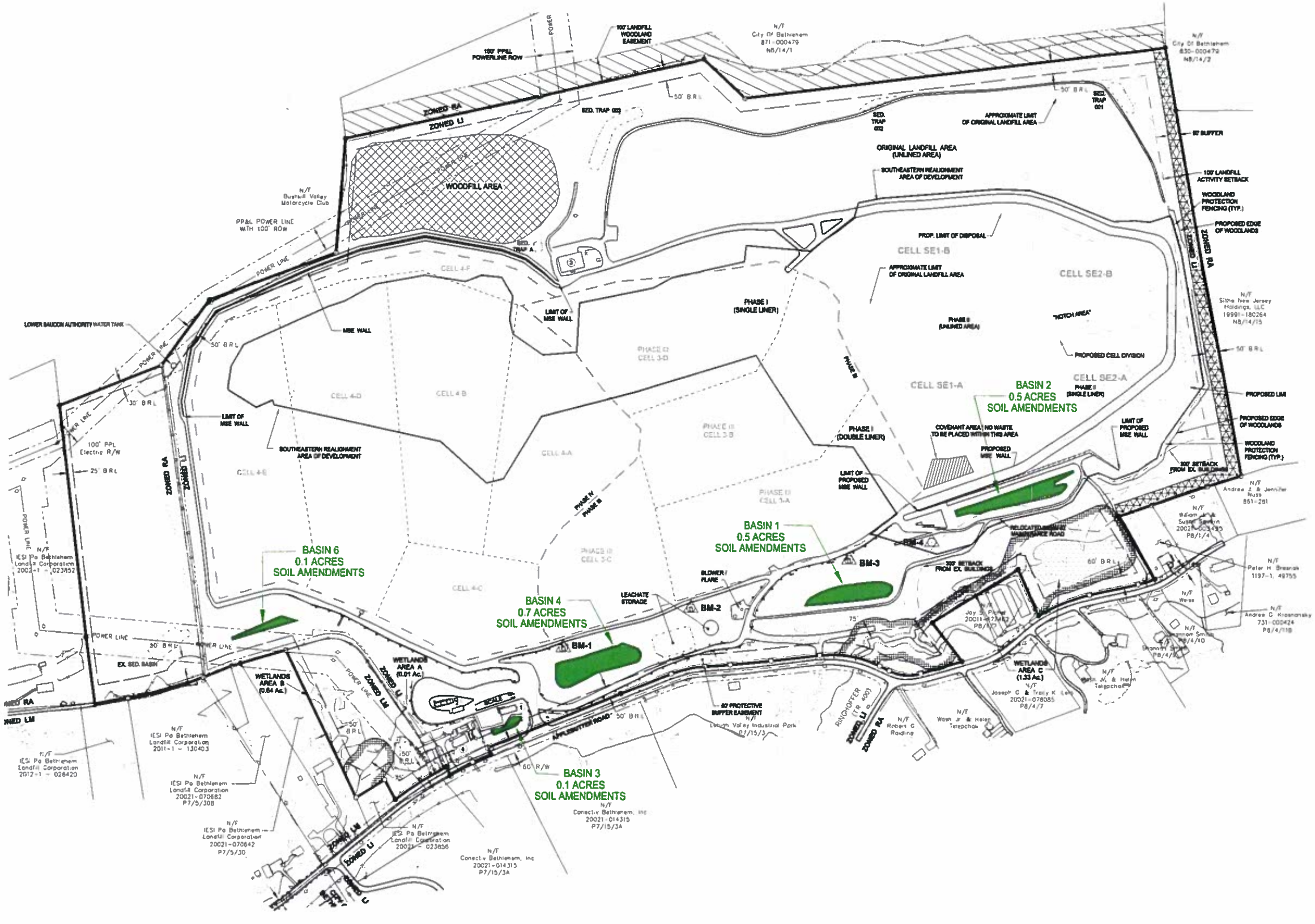
ZONING BOUNDARY (LI = LIGHT INDUSTRIAL, RA = RURAL AGRICULTURAL, LM = LIGHT MANUFACTURING)

- OVERHEAD UTILITY POLE
- FENCE
- EASEMENT LINE
- RIGHT OF WAY LINE
- SOUTHEASTERN REALIGNMENT - MSE BERM
- SOUTHEASTERN REALIGNMENT - ACCESS ROAD
- SOUTHEASTERN REALIGNMENT - AREA OF DEVELOPMENT
- SOUTHEASTERN REALIGNMENT - CELL DIVISION
- SOUTHEASTERN REALIGNMENT - LIMIT OF DISPOSAL

ACCESS ROAD

- WETLAND AREAS
- RIPARIAN CORRIDOR BUFFER
- STREAM PROTECTION EASEMENT
- WOOD LINES, TREE MASSES
- LANDFILL WOODLAND EASEMENT
- WOODFILL AREA

- 50' BUFFER W/PLANTING SCREEN
- WOODLAND PROTECTION FENCING
- PROPOSED EDGE OF WOODLANDS



NO	REVISION	DATE

POST CONSTRUCTION STORMWATER BASIN - SOIL AMENDMENT PLACEMENT

LOWER SAUCON TWP.

NORTHAMPTON CO.

PRELIMINARY / FINAL LAND DEVELOPMENT PLAN & SITE PLAN

IESI PA Bethlehem Landfill Corp.

PENNSYLVANIA

martin and martin incorporated
37 south main street · suite A
phone: (717) 264-6759 chambersburg, pennsylvania · 17201

PROJ. NO. 1162.3 | DES. BY: DB | DRN. BY: RMB | CHK. BY: JM

SCALE: 200' 100' 0 200' 400' Scale: 1" = 200'

CADD FILE: 1162.3-LDP-009.dwg

DATE: 08/17/15

SCALE: 1" = 200'

DRAWING NO. 1

FILE: 1162.3 (INDEPENDENT SE-EXPANSION) 1162.3-POST-SAP.dwg