martin and martin, incorporated

37 south main street • suite A • chambersburg, pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
www.martinandmartininc.com

October 29, 2020

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

RE: Bethlehem Landfill Company
Northern Realignment
Amended Preliminary/Final
Land Development Plan, Site Plan and Lot Consolidation
Our file: b/1162.4/NR/LDP/102620

Dear Ms. Huhn:

Bethlehem Landfill Company ("BLC") hereby submits the following regarding the above referenced project, in response to a review letter issued by Hanover Engineering on September 17, 2020:

1. Revised Preliminary/Final Land Development Plan, Site Plan and Lot Consolidation Plan (Revised 10/29/2020) – twenty-five (25) copies;
2. Revised Preliminary/Final Land Development Plan, Site Plan and Lot Consolidation Plan (Revised 10/29/2020) (11x17 set) – twenty-five (25) copies;
3. Revised Cover Sheet and Table of Contents of the Land Development Supporting Documents Binder (Revised 10/29/2020) – four (4) copies;
4. Revised Section 2 of the Land Development Plan Supporting Documents Binder (Revised 10/29/2020) – four (4) copies;
5. Revised Section 10 (Volume #2) of the Land Development Plan Supporting Documentation Binder, Post Construction Stormwater Plan (Revised 10/29/2020) – four (4) copies;
6. Revised Section 12 of the Land Development Plan Supporting Documents Binder, Surrounding Property Notifications (Revised 10/29/2020) – four (4) copies;
7. Revised Section 16 of the Land Development Plan Supporting Documents Binder, Aerial Mapping (Revised 10/29/2020) - four (4) copies; and,
8. October 29, 2020 letter from Martin & Martin, Incorporated responding to a review letter for this project issued by Hanover Engineering Associates dated September 17, 2020 with Attachments – four (4) copies.

As noted above the Cover Page, Table of Contents and Sections 2, 10 and 12 of the Land Development Plan Supporting Documents Binder have been revised. Due to the size of the binders the Land Development Plan Supporting Documents Binder has been split into a Volume #1 and #2. The only Section within Volume #2 is the PCSM Narrative. The attached revised sections replace in their entirety those sections previously submitted.

All remaining sections remain unchanged from what was provided in the Land Development Supporting Document binders as part of the original submission.

In the event any questions arise concerning this correspondence please do not hesitate to contact this office at your convenience.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. McDowell, P.E.

cc: Lehigh Valley Planning Commission
BLC – David Pannucci
Land Air Water Legal Solutions LLC

martin and martin, incorporated

37 south main street • suite A • chambersburg, pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
www.martinandmartininc.com

October 29, 2020

Ms. Leslie Huhn, Manager
Lower Saucon Township
3700 Old Philadelphia Pike
Bethlehem, PA 18015-5426

RE: Bethlehem Landfill Company
Northern Realignment
Tax Map Parcel P7 Block 5 Lot 33
LST Project LD03-20
Hanover Project LS20-30
Our file: b/1162.4/RL9172020

Dear Leslie:

We are in receipt of the September 17th, 2020 review letter issued by Hanover Engineering Associates, Inc. with regard to the above referenced project. Following are BLC's responses to each of the comments raised in those letters, highlighted in **bold** for ease of reference.

A. SUBDIVISION AND LAND DEVELOPMENT ORDINANCE – CHAPTER 145

1. Section 145-9 and SMO Section 137-30 – The Approved Waivers note on Sheet 1 shall be revised accordingly based on action by the Township Council.

   All notations on Sheet #1 regarding waivers will be updated based upon Township Council action.

2. Section 145-21.B.(1)(d)[2] – The Planning Commission shall not recommend approval of a preliminary plan until any special exception approval is received.

   Acknowledged – No plan revision required.

3. Section 145-21.B.(1)(d)[7] – The Township may wish to have its emergency response personnel (police, fire, etc.) review the plan.

   The Township posted an email dated 8/22/2020 that the FM had no issues as it relates to fire safety and protection. No plan revisions required.

4. Sections 145-22.A and 145-33.A – Preliminary plan approval is required prior to submission of a final plan. **The Applicant has requested a waiver to submit a combined preliminary/final land development plan submission.**

   Waiver Requested – No plan revision required.

5. Sections 145-30 and 145-34.D.(6) – A certificate of insurance naming the Township and Township Engineer shall be provided. **The Applicant has requested a waiver of these requirements.**

   Waiver Requested – No plan revision required.

6. Section 145-33.B.(1) – For the plan layout, the horizontal scale shall be a minimum of one inch equals 100 feet for lots greater than one (1) acre. Several overall plan views are drawn at scales of one inch equals 200, 300 and 400 feet. **The Applicant has requested a waiver of this requirement.**

   Waiver Requested – No plan revision required.

7. Section 145-33.C.(1) – The following comments regarding the existing features shall be satisfactorily addressed:
   a. The existing structures shown on the LM-zoned portion of the property shall be deleted from the Plans, as they no longer exist on the site.

      The existing structures previously shown in the LM zoned portion of the subject property have been removed from all plan sheets as these structures have been demolished.

   b. The Sheet 5 plan view shall be revised to include the former Helms and Redington properties.

      Plan Sheet #5 of 17 has been revised to depict the entire consolidated lot which includes the former Helms and Redington parcels.

8. Sections 145-33.C.(1) and 145-34.C.(3) – The location of all existing features within 500 feet of any part of the land to be developed shall be identified on the Plan. **The Applicant has requested a waiver of this requirement.**

   Waiver Requested – No plan revision required.

9. Section 145-33.C.(2) – The location of all existing contour lines on or within 500 feet of any part of the land to be developed shall be identified on the Plan. **The Applicant has requested a waiver of this requirement.**

   Waiver Requested – No plan revision required.

10. Section 145-33.C.(3) – The Floodplain Area shading shown in the Key/Legend on Sheet 4 shall be checked, as this shading is identified as wetlands in the plan view.

Plan Sheet #4 of 17 has been revised to provide separate and distinct hatch patterns for the floodplain and wetland areas mapped on the Consolidated Lot and identified in the Legend.

11. Section 145-33.C.(4) – The following comments regarding the existing easements and rights-of-way shall be satisfactorily addressed:

a. The Applicant proposes landscaping within the existing PPL powerline right-of-way at the northwest corner of the proposed realignment, and the Applicant shall provide a review and approval letter from PPL regarding the proposed landscaping.

Plan Sheets 10, 11, 12, and 17 of 17 have been revised to remove all proposed landscaping from within the existing PPL easement. The removed landscaping has been relocated to adjacent areas in order to comply with required landscaping for the proposed project as it relates to proposed impervious area mitigation.

b. A copy of the existing scenic conservation easement agreement, including any pertinent restrictions, on the adjoining lots to the north and northeast shall be submitted to the Township Solicitor for review and comment.

Copies of the recorded Conservation Easements on the former Helms and Redington Properties are attached hereto.

c. The "Scenic Conservation District" labels in the plan view on Sheet 8 shall be revised to reference the "Scenic Conservation Easement."

Plan Sheet #8 of 17 has been revised to label the Scenic Conservation Area as an Easement and not a district.

d. The Applicant shall clarify the Lehigh River Buffer Easement listed in the Key/Legend on Sheet 4, as it does not appear to be identified in the plan view.

Plan Sheet #4 of 17 has been revised to remove the reference to a Lehigh River Buffer Easement in the Key/Legend. No such easement exists.

12. Section 145-33.D.(2) – The following comments regarding the proposed lot consolidation and lot area shall be satisfactorily addressed:

a. The property line information along the northern existing landfill property line and the common Helms and Redington Parcel lines shall be identified on the Sheet 2 to confirm the existing lot areas.

Plan Sheet #2 of 17 has been revised to include bearing and distance information for the lines identified as Former Tract Division Lines.

b. The "Former Tract Division Line" label on Sheet 2 shall be revised to include "To Be Deleted."
Plan Sheet #2 of 17 has been revised to add the notation "to be deleted" to the labeling of Former Tract Division Lines.

c. The overall consolidated lot area in both acres and square feet listed in the Sheet 2 plan view shall be checked and revised accordingly, as it does not equal the sum of the individual lot net areas.

Plan Sheet #2 of 17 and all other plan sheets with notations regarding the area of the consolidated lot have been updated to correctly state the total gross and net acreage of the consolidated lot.

d. The proposed Riverside Drive right-of-way information is not provided on the Plans; therefore, we cannot confirm the right-of-way area listed on Sheet 2.

Plan Sheets #2 and #3 of 17 have been revised to include a bearing and distance description of the ultimate future reserved right-of-way area for Riverside Drive which is located within the area of the consolidated lot.

e. The Applicant shall confirm the Hahn and Mass & Reuss-Flowers properties along the Riverside Drive are not included in the proposed lot consolidation. It appears the proposed Riverside Drive right-of-way area includes that portion of the right-of-way along the Hahn and Mass & Reuss-Flowers properties.

The Hahn and Mass & Reuss-Flowers Properties are exceptions to the Helms Tract and described accordingly on Plan Sheet #2 of 17. As shown on Sheet #3 of 17 the right-of-way area within the consolidated lot is calculated outside these existing excepted lots.

13. Sections 145-33.D.(4) and (19) – The following comments regarding the proposed landfill grading and limits shall be satisfactorily addressed:
a. The Township shall determine whether the Township Building Code Official shall review and comment on the acceptability of the proposed MSE (mechanically stabilized earth) berm, as it serves as a retaining wall structure. We note the MSE berm has a maximum height of approximately 110 feet.

Please note that the Township determined that the MSE berms associated with the Cell 4F and Southeastern Realignment projects were not required to be reviewed by Township Building Code Official. Attached is email correspondence between counsel for BLC and the Township Zoning Officer and Township Solicitor, dated October 18, 2017, confirming the same.

b. The "DEP Permit Boundary As Taken From March 1994 Permit Drawings" line shall be clearly identified in the plan view on Sheet 4.

Plan Sheet #4 of 17 has been revised to more clearly identify the existing PaDEP Permit Boundary using the color red. Generally, the permit boundary follows the former landfill lot with some exceptions.

c. The "Landfill Property Line (224 Acre Consolidated Deed" line shall be clearly identified in the plan view on Sheet 4. Additionally, the DEP Permit Limit and Property Line referenced in Note 5 on Sheet 4 shall be clearly identified in the plan view on Sheet 4.

Plan Sheet #4 of 17 has been revised to more clearly identify the consolidated lot. The line type and acreage reference in the Key/Legend has been revised to be consistent with the plan views.

14. Section 145-33.D.(5) – Any references to the pending lot consolidation throughout the Plan set shall be deleted.

All plan sheets and notations throughout the plan set have been revised to eliminate any reference to "pending or subject to lot consolidation".

15. Sections 145-33.D.(6) and 145-34.C.(7) – The lot size, to the nearest square foot, shall be identified on the Plans.

Plan Sheet #2 of 17 has been revised to include the square footage of the consolidated lot.

16. Sections 145-33.D.(11) and 145-34.C.(5) – The 50-foot building restriction line label and dimension arrows along the former northern landfill property line on Sheet 2 shall be deleted.

Plan Sheet #2 of 17 and all other plan view sheets have been revised to delete the building setback line along the northern property line of the landfill now referenced as a former tract division line.

17. Section 145-33.D.(14) – The Typical Access Road Section Detail (Paved) shall be revised to specify Superpave materials.

Plan Sheet 14 of 17 has been revised to provide superpave material specifications for the paved access road typical section.

18. Section 145-33.D.(15) – The following comments regarding the proposed easements shall be satisfactorily addressed:
    a. Easement line information is not provided for the proposed easements on the former Helms and Redington parcels; therefore, we cannot confirm the easement area listed on Sheet 2.

Plan Sheet #3a of 17 has been added to the set to include details and descriptions of all easements on the former Helms and Redington Tracts.

b. Any other proposed easements, along with the ownership, maintenance responsibilities and restrictions, shall be identified on the Plans.

No easements are proposed as part of the project. All existing easements have been notated as to their ownership and reference of recording.

19. Section 145-33.D.(16) – Any proposed/required no parking and fire zones, as applicable, shall be identified on the Plans.

No structures to be occupied are proposed as part of the project. All existing no parking/fire zones which exist onsite shall remain unchanged.

20. Section 145-33.E.(6) – A soil erosion control plan and narrative shall be provided.

The Soil Erosion Control Plan and Narrative are made part of the PaDEP Major Modification Application as Form I. Said application shall be provided to the Township upon submission to PaDEP under separate cover. Since the Solid Waste Permit for the Northern Realignment requires compliance with PA Chapter 102 regulations a separate NPDES Permit for Construction Activities is not required. Thus, no application with the Northampton County Conservation District is required.

21. Section 145-33.E.(7) – The quantities of American Holly (IO) and Eastern Red Cedar (JV) trees listed in the Plant Schedule on Sheet 17 shall be checked and revised to be consistent with the plan view.

Plan Sheet #17 for 17 has been revised to correct the quantities list to match the plan view for the proposed number of plantings.

22. Sections 145-33.E.(8) and 145-34.C.(10) – A Landfill Time Line shall be provided on the Plans, similar to the Southeastern Realignment Plans. Additionally, the date set for completion of all proposed and required improvements shall be identified on the Plans.

Plan Sheet 16 of 17 has been revised to include a timeline of proposed development for the project.

23. Section 145-33.E.(9) – The Township may require a sketch plan layout for the contiguous land holdings of the developer which are not shown in the Preliminary/Final Plan.

BLC acknowledges ownership and control of several tracts and parcels of land adjacent to the consolidated lot. The Northern Realignment Land

Development Plan depicts all proposed improvements contemplated at this time by BLC. No improvements are proposed outside the current PaDEP Solid Waste Permit boundary or consolidated lot.

24. Section 145-33.E.(12) – Verification of the surrounding property owner notification mailings, including a copy of the names, addresses and tax parcel numbers of each person to whom the notice was mailed, shall be provided to the Township within fifteen (15) days of submission.

Copies of the required notices are included within revised Section 12 of the Land Development Plan Supporting Documents Binder.

25. Sections 145-33.F.(1)(a) and 145-34.C.(9)(a) and Appendix B-7 – The Township standard notices for drainage facilities and easements shall be listed on the Plan. **The Applicant has requested a waiver to modify the standard notices to only reference drainage facilities and omit easements, as drainage easements are not proposed.**

Waiver Requested – No plan revision required.

26. Sections 145-33.F(2) and 145-34.E.(3) and Appendix B-1 and ZO Section 180-102.C.(2)(g) – The owner shall sign and notarize the Owner's Certification.

Acknowledged – Prior to Final Plan recording the plans shall be signed and notarized by the owner.

27. Section 145-34.C.(6) – If applicable, any proposed deed restrictions, lease agreements or covenants affecting the land development of the property shall be provided for review.

No deed restrictions, lease agreements or covenants affecting land development of the consolidated lot are proposed as part of the Northern Realignment.

28. Section 145-34.D – The Applicant shall provide copies of any revised DEP Solid Waste Permits for the proposed landfill realignment.

Upon submission of the PaDEP Solid Waste Permit Application copies will be provided to the Township.

29. Sections 145-34.D.(2) and 145-44.B – The Applicant shall provide documentation from PennDOT that the existing driveway to Applebutter Road is adequate to service the proposed landfill realignment.

We have contacted PennDOT to obtain the documentation of adequacy requested for the existing driveway. Upon receipt we will provide the same to the Township.

30. Section 145-34.D.(5) – The Township may require an agreement, as a covenant running with the land, that is accepted and approved by the Township, describing the property owner's responsibilities for the operation and maintenance of stormwater management facilities and BMPs in accordance with the Developer's postconstruction operation and maintenance plan. **The Applicant has requested a waiver of this requirement.**

Waiver Requested – No plan revision required.

31. Section 145-34.D.(6) and 145-35.A – If applicable, the Applicant shall provide a copy of an agreement and security that is accepted and approved by the Township to secure the completion of any required improvements that have not yet been completed.

Attached hereto is an Engineer's Opinion of Costs associated with the proposed landscaping for the Northern Realignment. These landscape improvements are the only improvements not included within the bonding required by PaDEP as part of the Solid Waste Permit. Further, the landscaping being relocated for the Basin #2 modification is not included as those are previously bonded as part of the Southeastern Realignment.

32. Section 145-34.D.(8) – A letter of approval of the soil and erosion control plan by the Northampton County Conservation District and/or DEP shall be provided.

The Soil Erosion Control Plan and Narrative are made part of the PaDEP Major Modification Application as Form I. Said application shall be provided to the Township upon submission to PaDEP under separate cover. Since the Solid Waste Permit for the Northern Realignment requires compliance with PA Chapter 102 regulations a separate NPDES Permit for Construction Activities is not required. Thus, no application with the Northampton County Conservation District is required.

33. Section 145-34.E.(8) – The individual that is responsible for the identification of the wetlands and the limits thereof shall sign and seal the Plans.

The Wetland's Specialist who identified the wetlands on the consolidated lot has signed the plans on Plan Sheet #1 of 17.

34. Sections 145-41.B.(4) and 145-45.B.(3), (4) and (9) – When the existing roads (Applebutter Road, Skyline Drive and Riverside Drive) adjacent to the property being developed do not meet the construction standards (right-of-way width, cartway width, curbing and sidewalk) of this chapter and its Appendix A, then in that case, the Developer shall provide those improvements. **The Applicant has requested a waiver of these requirements.**
Waiver Requested – No plan revision required.

35. Section 145-45.G.(2) – Any proposed "haul roads" shall meet the driveway specifications of this Section. **The Applicant has requested a waiver of this requirement.**

Waiver Requested – No plan revision required.

36. Section 145-46.B.(3) – Storm drainage easements shall be provided. **The Applicant has requested a waiver of this requirement.**

Waiver Requested – No plan revision required.

37. Section 145-51 – The Township shall determine whether the Applicant shall meet the Township Open Space and Recreation requirements for nonresidential development.

Please note that the Township did not find the Open Space and Recreation requirements for non-residential developments to be applicable for the Phase IV Expansion, Cell 4F Project, or the Southeastern Realignment, as the use of the property was not changing as a result of those projects. Similarly, the use is not changing as part of the proposed Northern Realignment Project.

38. Section 145-52.A – Existing healthy trees eight (8) inches or greater in diameter, measured at a height of 4 ½ feet above original grade (as measured from the uphill side of the tree) shall be preserved wherever possible. Normally, trees meeting this criterion shall not be removed without the approval of the Township.

Woodland removal is limited to the impacted area (11.08 acres) as identified on Plan Sheet 9 of 17, Exhibit #3. The Land Development Plan seeks approval from the Township to remove the woodlands identified within this impacted area.

39. Section 145-52.B – The references to Section 145-52.B in Street Tree Notes & Calculations Notes 2 and 3 on Sheet 17 shall be revised to reference the Township Subdivision and Land Development Ordinance, rather than the Zoning Ordinance.

Plan Sheet #17 of 17 has been revised to reference the SALDO vs. the Zoning Ordinance within Notes #2 and #3.

40. Section 145-52.C – At least one (1) tree shall be provided for each 500 square feet of new impervious cover. The Applicant shall provide a tabulation of the number of required and proposed trees to meet this requirement.

Plan Sheet #17 of 17 has been revised to include a tabulation to show compliance with 1 tree per 500 sf of proposed impervious area requirement.

B. STORMWATER MANAGEMENT ORDINANCE – CHAPTER 137

1. Sections 137-6.D and 29 – Please note that our Stormwater Management Ordinance review was limited to only those features which have been revised and does not comment on the current Ordinance compliance of existing facilities (pipes, swales, basins, etc.) that were previously analyzed for drainage areas that have not been revised.

   Acknowledged. No plan revision required.

2. Sections 137-11.L and 137-15.A – No earth disturbance activities associated with any regulated activities shall commence until approval by the Township of a plan which demonstrates compliance with the requirements of this Chapter.

   Acknowledged. No plan revision required.

3. Section 137-13.A – A comparative pre- and post-construction stormwater management hydrograph analysis for the drainage area flowing towards the north shall be provided. While the drainage area flowing towards the north has been decreased by the proposed Northern Realignment, additional impervious area has been added to the remaining drainage area flowing towards the north.

   A comparative pre- and post-construction stormwater management hydrograph analysis for the drainage area flowing towards the north (Lehigh River Drainage Area) has been provided in Appendix N of the revised Post Construction Stormwater Management Report (PCSM Report) located within the Land Development Supporting Documents Binder, Section 10.

4. Sections 137-15.B, E and H – The following comments regarding the water quality volume (WQv) calculations in Appendix L of the Post Construction Stormwater Management Report shall be satisfactorily addressed:

   a. The WQv listed in the first paragraph shall be revised to be consistent with the calculations in Section 9.0 on Pages 15 and 16.

      The PCSM Report within Section 10 of the Land Development Plan Supporting Documents Binder has been revised for consistency. The WQv listed on pages 15 and 16 of the PCSM Report is consistent with the calculations in Appendix L of the PCSM Report.

   b. The actual 2-year runoff volume captured and treated by the proposed BMPs shall be identified to verify that it meets the WQv.

      Appendix L of the PCSM Narrative contained within Section 10 of the Land Development Plan Supporting Documents Binder has been revised to include additional narrative discussion regarding the Water Quality Volume for the site. Further, we have completed a PaDEP PCSM Spreadsheet included in Appendix L which outlines the capture

volumes for the proposed BMPs. However, in the end compliance with the Ordinance as stated in the Narrative is utilizing two (2) acceptable BMPs in series to meet water quality requirements when infiltration is prohibited.

c. A WQv calculation shall be provided to the drainage area flowing towards the north.

A WQv calculation for the drainage area flowing towards the north has been provided in Appendix N of the revised PCSM Report within Section 10 of the Land Development Plan Supporting Documents Binder.

5. Section 137-18.E – The minimum circular orifice diameter for controlling discharge rates from detention facilities shall be three inches. **The Applicant has requested a waiver of this requirement to allow two 2-inch orifices.**

Waiver Requested. No plan revision required.

6. Section 137-18.F – The Proposed Basin Landscaping shadings shall be shown in the plan view on Sheet PC-4.

Plan Sheet PC-4 has been revised to depict the proposed basin landscaping.

7. Section 137-18.H – A fence, with locking gate, shall be provided around Basin #2, and the fence shall be at least three (3) feet from the inside edge of the berm (or top of slope) and five (5) feet from the outside top of the berm. **The Applicant has requested a waiver of this requirement to allow the existing perimeter security fence to meet this requirement.**

Waiver Requested. No plan revision required.

8. Section 137-18.L – Basin #2 shall meet the maximum depth, interior slope, 8-hour drainage and fencing requirements of this Section. **The Applicant has requested a waiver of this requirement.**

Waiver Requested. No plan revision required.

9. Section 137-18.N – The minimum slope of the bottom of a detention facility shall be 1% toward the outlet structure. **The Applicant has requested a waiver of this requirement.**

Waiver Requested. No plan revision required.

10. Section 137-18.O – The Basin 2 emergency spillway elevation listed in the plan view on Sheets 5, 11 and PC-4 shall be checked and revised accordingly, as it is listed as 476.75; however, it is listed as 476.95 in the calculations, details and other plan views.

The Basin 2 emergency spillway elevations have been checked and revised accordingly to specify a Basin 2 emergency spillway elevation of 476.95'. Please see revised Sheets 11, and PC-4.

11. Section 137-19.F.(2) – Slopes for swale banks shall not be steeper than one (1) vertical for three (3) horizontal. The Applicant proposes swale banks of one (1) vertical to two (2) horizontal.

Waiver Requested. No plan revision required.

12. Section 137-19.G.(1).(b) – All inlets shall be labeled with an embedded plastic disk indicating a prohibition against pollutants.

Notes have been added to the inlet schedule and summary of culvert pipes schedule on revised Plan Sheet PC-5 stipulating that proposed inlets and stormwater manholes shall be labeled with an embedded plastic disk indicating a prohibition against pollutants.

13. Section 137-19.G.(3) – Watertight joints shall be specified for the proposed HDPE storm sewer pipe.

Note 11 has been added to the Summary of Culvert Pipes Schedule on revised Plan Sheet PC-5 stipulating that proposed storm sewer pipes shall have watertight joints.

14. Sections 137-19.G.(7) and (16) – Culvert C-17 shall have a maximum length of 300 feet between structures.

Culvert C-17 has been revised on all plan view sheets to provide less than 300 feet between structures by adding proposed SWMH #14. Please see sheet PC-7 for a revised profile of Culvert C-17. Additionally, the PCSM Report has been revised to include calculations for the new section of Culvert C-17 with Appendix K.

15. Section 137-19.G.(8) – **The Applicant has requested a waiver of this Section to allow concrete drainage structures which do not meet PennDOT specifications; however, several notes on Sheet PC-5 state the catch basins and inlet tops shall be constructed in accordance with PennDOT Publication 408. Clarification is requested.**

Waiver Requested. No plan revision required. While the plans reference the "PennDOT" standard, the applicant seeks to have flexibility where necessary based upon site constraints to modify the PennDOT Specifications.

16. Section 137-19.G.(10) – Concrete end walls or wing walls in accordance with PennDOT standards and with 30-inch concrete footings shall be provided. **The Applicant has requested a waiver from meeting PennDOT standards and**

providing a 30-inch concrete footing. We note the Summary of Culvert Pipes Note 9 on Sheet PC-5 specifies a 24-inch footer.

Waiver Requested. No plan revision required.

17. Section 137-19.G.(11) – Upstream open culvert headwalls or wingwalls for pipes shall be fitted with slanted durable protective grates.

Notes have been added to all upstream open culvert headwall or wingwall details on Plan Sheet PC_5 stipulating that they shall be fitted with slanted durable protective grates.

18. Section 137-19.G.(13) – The maximum permissible storm sewer pipe velocity shall be 15 feet per second. Calculations documenting the pipe velocities shall be provided.

The PCSM Plan contained within Section 10 of the Land Development Plan Supporting Documents Binder has been revised to add velocity calculations for all storm sewer piping documenting compliance with the maximum velocity of 15 feet per second. Refer to Appendix K of the revised PCSM report.

19. Section 137-19.G.(14) – Fixed pipe conveyance of stormwater must be to the same destination (detention basin) as stormwater would be conveyed overland if the fixed pipe conveyance system were to fail. **The Applicant has requested a waiver of this requirement.**

Waiver Requested. No plan revision required.

20. Sections 137-21.A and D and 137-22.A.(1) – No regulated earth disturbance activities within the Township shall commence until approval by the Township of an erosion and sediment control plan for construction activities. Written approval by DEP or the Northampton County Conservation District shall satisfy this requirement.

The Soil Erosion Control Plan and Narrative are made part of the PaDEP Major Modification Application as Form I. Said application shall be provided to the Township upon submission to PaDEP under separate cover. Since the Solid Waste Permit for the Northern Realignment requires compliance with PA Chapter 102 regulations a separate NPDES Permit for Construction Activities is not required. Thus, no application with the Northampton County Conservation District is required.

21. Section 137-21.B – A soil erosion control plan and narrative shall be provided.

The Soil Erosion Control Plan and Narrative are made part of the PaDEP Major Modification Application as Form I. Said application shall be provided to the Township upon submission to PaDEP under separate cover. Since the

Solid Waste Permit for the Northern Realignment requires compliance with PA Chapter 102 regulations a separate NPDES Permit for Construction Activities is not required. Thus, no application with the Northampton County Conservation District is required.

22. Section 137-21.C – A copy of any required NPDES Permit or Permit Modification shall be provided to the Township.

Acknowledged. No plan revision required.

23. Section 137-22.B – A copy of all plans, with supporting calculations, which have received a government agency permit, shall be provided to the Township and Township Engineer.

Acknowledged. No plan revision required.

24. Section 137-23.M – No ground may be proposed or altered to exceed a slope steeper than one (1) vertical for three (3) horizontal. **The Applicant proposes slopes of one (1) vertical for two (2) horizontal and has requested a waiver of this requirement.**

Waiver Requested. No plan revision required.

25. Section 137-26.C.(2) – The following comments regarding the Post Construction Stormwater Management Report, design calculations and Plans shall be satisfactorily addressed:

a. The Basin #2 post-development runoff rates listed in Table 8.0 on Page 14 of the Report shall be revised to be consistent with the routing calculations in Appendix H of the Report.

Table 8.0 on page 14 of the revised PCSM Report within Section 10 of the Land Development Plan Supporting Documents Binder has been revised to be consistent with the routing calculations in Appendix H of the revised PCSM Report.

b. The Channel CC and Channel BB time of concentration flows paths utilized in the calculations in Appendix E of the Report are not consistent with the information listed in the Time of Concentration Path tabulation on Sheet SW-2.

The Time of Concentration Path Tabulation on Plan Sheet SW-2 contained within the revised PCSM report has been revised to be consistent with the calculations contained within the report in Appendix E.

c. The scale of Sheet SW-2 shall be checked and revised accordingly.

The scale of Sheet SW-2 contained within the PCSM report has been revised from 1"=150' to 1"=200'.

d. The Basin #2 outlet structure facility shall be clarified, as the routing calculations identify it as a 36-inch riser pipe and the Plans specify a 2-foot x 4-foot inlet box.

The SEDCAD computer modeling software was used to model stormwater routing through proposed Basin #2. The modeling software has limited inputs for outlet structures and does not include a 2' x 4' inlet box. Thus, a 36" riser pipe was utilized for modeling purposes only to equate to the opening size of the inlet box. Thus, while no circular pipe is proposed the modeling is equivalent.

e. The Basin #2 capacity listed in the Elevation-Capacity-Discharge Table shall be checked, as we calculate a smaller volume based on the Plan contour lines. Additionally, the Elevation-Capacity Table on Sheet PC-4 shall be clarified, as it lists a Modified Area and Capacity; however, a note below the table states "no modifications to capacity proposed."

The elevation capacity table submitted for the Northern Realignment is identical to that approved for the Southeastern Realignment. However, upon review it has been determined that the as-built conditions of Basin #2 are not equivalent to that presented in this application. Thus, the plan set has been revised to propose a modification to Basin #2 to achieve the capacities presented within the routing calculations. In order to meet the capacity required, Basin #2 has been enlarged. Modifications include regrading the interior southern slope, shifting the outlet structure and placement of a retaining wall to limit impacts to the exterior slope of the basin berm. These revisions are presented on revised plan sheets and details throughout the plan set most notably on Plan Sheet PC-4.

f. The Channel N, Channel DS-7, Channel DS-8 and Channel DS-9 slopes listed/utilized in Appendix J and listed in the Summary Hydraulic Design of Permanent/Temporary Waterways chart on Sheet PC-6 shall be checked and revised accordingly, as different slopes are listed on Pages J-4,-7 and -8, utilized in the calculations and listed in the chart.

The slopes of all proposed channels have been checked and revised accordingly for consistency between the plans and the PCSM report contained within Section 10 of the Land Development Plan Supporting Documents Binder. Refer to Appendix J of the revised PCSM report and revised Plan Sheet PC-6.

g. The Culvert C-23 Apron length listed on Page K-3 of the Report shall be checked and revised accordingly.

Page K-3 of the PCSM report within Section 10 of the Land Development Plan Supporting Documents Binder has been checked and revised accordingly. The apron length has been revised from 261' to 28'.

h. The maximum headwater utilized in the Culvert C-17 @ 1.00% calculation in Appendix K of the Report shall be checked and revised accordingly, as it is listed as 4.0 feet on Page K-1.

Page K-1 of the PCSM report within Section 10 of the Land Development Plan Supporting Documents Binder has been checked and revised accordingly. The 4.0' listed on page K-1 has been revised to agree with the 6.0' listed on the SedCad printout for Culvert C-17@1.00%.

i. The Basin #2 emergency spillway side slopes shall be revised to be consistent in Appendix M of the Report and the detail on Sheet PC-4.

The emergency spillway side slopes (4:1) of Basin #2 have been revised to be consistent with Appendix M of the PCSM report. Please see revised Sheet PC-4.

26. Section 137-26.C.(4) – The following comments regarding the details and specifications for the construction of the stormwater management controls and BMPs shall be satisfactorily addressed:

a. The 48-inch Culvert C-25 pipe information listed in the Summary of Culvert Pipes on Sheet PC-5 shall be checked and revised accordingly, as it appears this pipe information should be deleted.

Sheet PC-5 has been checked and revised accordingly. The 48-inch line (C-25) has been deleted from the Summary of Culvert Pipes table.

b. The SWMH #3 628.00 invert elevation listed in the profile on Sheet PC-7 shall be checked, as it appears it should be deleted.

Sheet PC-7 has been checked and revised accordingly. C-22 empties into SWMH #3 at elevation 628.00. C-17 and C-23 intersect SWMH #3 at 621.72 and 621.62 respectively. The plan has been revised to clearly depict these invert locations.

c. The Rock Outlet Protection detail on Sheet PC-5 shall be checked and revised accordingly, as it is not consistent with the design calculations on Pages K-5 and -6 of the Report.

Sheet PC-5 has been checked and revised accordingly. The Rock outlet detail and table have been updated so as to make them consistent with the riprap apron design figures contained within Appendix K of the PCSM report.

d. The following storm sewer construction details shall be provided on the Plans: inlets, manholes, headwall/endwall and storm sewer pipe bedding and backfill.

The Post Construction Stormwater Management drawing set (PC Set) has been revised to included construction details for inlets, manholes, headwall/endwall, and storm sewer pipe bedding and backfill on Plan Sheets PC-5 and PC-7.

27. Section 137-26.C.(5) – A staging or implementation schedule for constructing the proposed stormwater control system shall be provided.

The implementation schedule for construction of the proposed stormwater control system is provided in Appendix O of the revised PCSM report contained within Section 10 of the Land Development Plan Supporting Documents Binder.

28. Section 137-26.D – The owner shall sign the stormwater management system note on Sheet PC-1.

Acknowledged. The owner shall sign Plan Sheet PC-1 to Final Approval and Recordation of the Plan.

29. Section 137-26.D and E, -34, -36, -37 and -38 – Prior to final plan approval and recording, the owner's responsibility for facility ownership, maintenance, repair and replacement shall be described in a legal agreement between the owner and the Township. **The Applicant has requested a waiver of these requirements.**

Waiver Requested. No plan revision required.

30. Sections 137-28.B and C – A copy of the Lehigh Valley Planning Commission (LVPC) stormwater management review letter shall be provided upon receipt.

A copy of the Lehigh Valley Planning Commission (LVPC) stormwater management review letter is included and attached with this response.

31. Sections 137-37.B and C – Easements shall be provided around any proposed stormwater management facilities. **The Applicant has requested a waiver of this requirement.**

Waiver Requested. No plan revision required.

32. Section 137-38.A – The Post Construction Stormwater Management Plans shall be recorded, as specified in the Table of Contents on Sheet 1 of 17.

Acknowledged. No plan revision required.

33. Appendix I – The Storm Drainage Maintenance and Easement notes shall be provided on the Plans. **The Applicant has requested a waiver of this requirement.**

Waiver Requested. No plan revision required.

C. ZONING ORDINANCE – CHAPTER 180

1. Sections 180-23.B and C – The RA minimum side (one and both) and rear yard requirements listed in the Site Data are not consistent with this Section and shall be revised accordingly.

Plan Sheet #10 of 17 has been revised to update the site data listing for setbacks to be consistent with the Ordinance for the RA District.

2. Section 180-80 – Site Plan approval in accordance with Section 180-102 is required for a proposed landfill and waste disposal facility.

Acknowledged – No plan revision required.

3. Section 180-80.B.(3) – Special exception approval by the Zoning Hearing Board is required for a proposed landfill and waste disposal facility. The Zoning Approval note on Sheet 1 shall be revised accordingly based on the Township Zoning Hearing Board action.

Upon action by the Zoning Hearing Board, notes on Sheet #1 of 17 will be updated to be consistent with these actions.

4. Sections 180-80.B.(3) and 180-81.A – The Existing Use listed in the Site Data shall be revised to include the RNG Facility as an accessory use. Additionally, the Proposed Use shall be clearly identified in the Site Data.

Plan Sheet #10 of 17 has been revised to clearly state the existing and proposed use as well as the accessory use of the RNG Facility. No change in use is proposed.

5. Section 180-83.B – Special side or rear yards shall be required for any LI zoned property abutting any residentially zoned land. These yards shall be a minimum of 75 feet. This yard shall contain a planting screen, as specified in Section 180-97.A and B. These special side and rear yards shall be listed in the Site Data and shown in the plan views.

Plan Sheet 10 of 17 has been revised to list the special side and rear yards abutting residentially zoned land in the site data chart as well as shown on the plan view for reference.

6. Section 180-92.A – Where a street has a required right-of-way greater than that existing, the required front yard of a lot shall be measured from the required right-of-

way line. It does not appear the required right-of-way line was used to measure the front yard setback along Riverside Drive.

Plan Sheets 2, 4 and 5 have been revised to depict the 50' front yard setbacks from the ultimate right-of-way of Riverside Drive for the consolidated lot.

7. Section 180-95.A.(2)(a) – For any development of a parcel equal to or greater than five acres in area, an aerial photo showing features within 1,000 feet of the parcel shall be submitted. The Aerial Mapping does not show features within 1,000 feet of the entire consolidated parcel and shall be revised accordingly.

Section 16 of the Land Development Plan Supporting Documents Binder has been updated to include an aerial map depicting features within 1,000 feet of the consolidated lot.

8. Sections 180-95.B.(1) – The following comments regarding the natural resources identification shall be satisfactorily addressed:

   a. The wetland areas identified on Sheet 4 shall be clarified; as it appears different shading is used to identify the wetlands on the existing landfill lot and the Redington Parcel. Additionally, the total wetland area listed in the Wetlands and Wetland Buffers section on Sheet 8 shall be revised accordingly.

      Plan Sheet 4 of 17 has been revised to utilize the same hatch pattern for all wetlands within the consolidated lot. Additionally, the notations regarding total wetland area on Plan Sheet 8 of 17 has been confirmed to be 2.22 acres within the consolidated lot.

   b. The areas of the 15% to 25% and greater than 25% steep slope categories listed in the Steep Slopes section on Sheet 8 and the Exhibit 2 Legend on Sheet 9 shall be checked and revised accordingly, as they appear to be greater than shown in the in the Exhibit 2 Plan.

      Plan Sheet 9 of 17 has been revised to report the correct areas for each steep slope category for Exhibit #2 with the Legend. Additionally, the reported areas and protection rates on Sheet 8 of 17 under the steep slopes narrative have been revised accordingly.

   c. The 25.46 acres impacted areas listed in both the Woodland and Steep Slope Legends on Sheet 9 shall be checked and revised, as they are not consistent with the sum of individual impact areas listed below the Legends.

      The impacted area of 25.46 acres is the total area of impact to undeveloped lands for Bethlehem Landfill since the Southeastern Realignment. This total area has several areas where there are no natural resources (woodlands and steep slopes). Thus, the total impacted area will not equate to the individual impacted resources listed in the Legend.

9. Section 185-19.B.(17)(b)[3] – Upon receipt of proof and certification from a licensed professional geologist that the area proposed for development is not underlain by carbonate geology, satisfactory to the Zoning Officer, this carbonate geology section of the Code does not apply. The Applicant shall provide a formal request for the exemption, signed and sealed by a Pennsylvania Professional Geologist, and include the supporting documents provided with this submission. Our office has no objections to the granting of this exemption.

Section 4 of the Land Development Plan Supporting Documents Binder supplied with the original submission includes letters, certifications and maps that prove the proposed Northern Realignment Area of Development as outlined on the Land Development Plans including Basin #2 Modifications is not underlain with Carbonate Geology. The documentation included within Section 4 was prepared by the Professional Geologist for the site and the Professional Geologist has certified on the Northern Realignment Land Development Plans that the facilities are not underlain with carbonate geology. Therefore, please accept this letter along with the Northern Realignment Land Development Plans and previously submitted Section 4 referenced as our formal request for exemption.

10. Section 180-95.C.(2)(c) – The maximum buildable site area listed in the Site Data on Sheet 10 shall be checked and revised accordingly, as it is not consistent with the area listed in the Buildable Area calculation on Sheet 8.

Plan Sheet #10 of 17 has been revised under Site Data, Maximum Buildable Area to be consistent with the analysis provided on Plan Sheet #8 of 17.

11. Section 180-96.D – The following comments regarding the Noise section of the Neighborhood Protection Analysis on Sheet 15 shall be satisfactorily addressed:

    a. The Noise Levels Based on Operating Conditions at a Distance of 15 Meters from Caterpillar Equipment table on Sheet 15 shall be relocated to below the first paragraph of Section D to correspond with the text in the first paragraph.

    Plan Sheet 15 of 17 has been revised to locate the referenced Table below the first paragraph of Section D.

    b. We note the noise level measurements listed in Table #1 were taken in January 2001.

    Acknowledged – No plan revision required.

12. Sections 180-98.C.(1) and 180-102.C.(2)(f) – A required and existing/proposed off-street parking tabulation for the existing and proposed uses shall be provided on the Plans.

The proposed project proposes no additional offstreet parking for the site. The project will result in no additional employees or need for any additional offstreet parking. Further, no changes are proposed to any existing offstreet parking areas. A note stating such has been added to Plan Sheet 10 of 17.

SITE PLAN REVIEW

13. Section 180-102.C.(2)(d) – Existing contours, at maximum two-foot intervals, shall be provided, unless modified by the Planning Commission.

This requirement was waived by the Planning Commission at their meeting on 9/24/2020.

14. Sections 180-102.C.(2)(o), 180-109.B and 180-109.F.(1)(a) – The following comments regarding the Project Narrative in the Supporting Documentation report shall be satisfactorily addressed:

The required Site Plan Narrative was included in the Special Exception Application binder that was submitted at the same time as the Preliminary/Final Land Development Plan submittal. A copy of that narrative is enclosed herein and has been added to Section 2 of the Land Development Supporting Documents Narrative.

a. The contact person for the development and operation phases of the facility shall be identified.

Page 6 of the Site Plan and Narrative provide the contact person for the site.

b. Documentation indicting compliance with all applicable requirements shall be provided.

The site plan and narrative added to Section 2 of the Land Development Plan Supporting Documents Narrative outlines compliance with all applicable requirements.

c. An explanation of the permitting process and status with other agencies, state and federal, shall be provided.

Page 7 of the Site Plan and Narrative provide the explanation of the permitting process.

d. The ultimate use and ownership of the site after completion of disposal shall be provided.

Page 7 of the Site Plan and Narrative provide the outline of ultimate use and ownership of the site as well as Section 7, Reclamation Plan, of the Land Development Plan Supporting Documents Binder.

e. There appears to be language missing from the Project Narrative at the bottom of Page 1/top of Page 2 which shall be clarified.

The project narrative in Section 2 of the Land Development Plan Supporting Documents Binder has been revised to include a missing language between the pages of the narrative previously omitted.

15. Sections 180-102.C.(2)(q) and 180-109.F.(1)(b)[6] – A copy of all Department of Environmental Protection and other applicable agencies' permits and supporting documents, including but not limited to applications, review comments, terms and conditions of permits, required by federal, state and local government agencies shall be provided.

Copies of all permits and approvals shall be provided to the Township upon receipt of permits and approvals.

16. Section 180-102.C.(2)(s) – The location, type and design of proposed soil erosion and sedimentation control devices, with appropriate narrative, and approval from the Soil and Water Conservation District of said plan shall be provided.

The Soil Erosion Control Plan and Narrative are made part of the PaDEP Major Modification Application as Form I. Said application shall be provided to the Township upon submission to PaDEP under separate cover. Since the Solid Waste Permit for the Northern Realignment requires compliance with PA Chapter 102 regulations a separate NPDES Permit for Construction Activities is not required. Thus, no application with the Northampton County Conservation District is required.

17. Section 180-102.C.(2)(t) – The Applicant's project narrative and Traffic Impact Analysis reports the Northern Realignment is not an expansion and proposes no change to the average daily or maximum tonnage; therefore, there is no additional trip generation as part of the project and a current Traffic Impact study is not required. Since the Landfill access is along a state highway, the Applicant shall provide documentation from PennDOT concurring with this position.

We have contacted PennDOT to obtain the documentation of adequacy requested for the existing driveway. Upon receipt we will provide the same to the Township.

INDUSTRIAL USES

18. Section 180-109.D.(1) – The minimum required lot area listed in the Site Data shall be checked and revised accordingly.

Plan Sheet #10 of 17 has been revised under Site Data to correctly indicate the minimum lot area of 4 acres.

19. Section 180-109.D.(4) – The maximum impervious coverage listed in the Site Data shall be checked and revised accordingly. We note it is not consistent with the Maximum Impervious Area calculation on Sheet 8. Additionally, the reference to "(as per 203.30 analysis)" in the Site Data on Sheet 10 of 17 shall be clarified.

Plan Sheet #10 of 17 has been revised under Site Data to be consistent with the analysis on Sheet #8 of 17 with regard to maximum impervious area allowable.

20. Sections 180-109.F.(2)(a) and 180-109.C.(2) – An earthen berm shall be placed no closer than 50 feet to all adjacent uses around the perimeter of a landfill or waste disposal facility and buffer yards and screening shall be provided. The Applicant requests that Township Council determine that the existing features serve as an acceptable substitute for the required berms, screening and buffers. Supplemental plantings may be required as a condition of site plan approval.

On 10/07/2020 Lower Saucon Township Council granted relief from the perimeter earthen berm requirement. A note stating such has been added to revised Plan Sheet 10 of 17.

21. Section 180-109.F.(2)(a) – No landfill or waste disposal facility activities shall be conducted less than 100 feet from a property boundary line. We note portions of the proposed maintenance road along the eastern portion of the site are located closer than 100 feet from the property and shall be revised accordingly.

Plan Sheet 10 of 17 has been revised as well as other plan sheets to relocate the proposed MSE Berm maintenance road to ensure compliance with the 100' landfill activity setback along the eastern property boundary.

22. Section 180-109.F.2.(b) – A security fence shall be required around the perimeter of the landfill or waste disposal activities at a point no closer than the required yard dimension to a lot line, and appropriate warning signs shall be mounted or posted along the fence at intervals of not more than 100 feet. We note there appears to be an existing fence along the property line.

A security fence around the perimeter of the landfill exists. No modifications to this security fencing are proposed as part of the Northern Realignment project.

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

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. McDowell, P.E.

cc: Mr. David Pannucci, Bethlehem Landfill Company (via email)
Maryanne Garber, Esquire, Land, Air, Water Legal Solutions, Inc. (via email)

Gmail Joe McDowell <jmcdowell@martinandmartininc.com>

Bethlehem - the email referenced in Response to SALDO comment 13

1 message

Maryanne Garber <mgarber@landairwater.com> Wed, Oct 28, 2020 at 9:05 AM
To: Joe McDowell <jmcdowell@martinandmartininc.com>

See below 10/18/17 email from me to Chris Garges confirming our conversation that the Building Code Official does not review the MSE berm that we reference in response to SALDO comment 13

bio | vcard | email | map | website

Maryanne Starr Garber

Land Air Water Legal Solutions LLC

p: 610.898.3852 | c: 215.696.7346

f: 877.853.9404

mgarber@landairwater.com

From: Maryanne Garber <mgarber@landairwater.com>
Sent: Wednesday, October 18, 2017 9:00 AM
To: Chris Garges <zoning@lowersaucontownship.org>; Linc Treadwell <lincwork@verizon.net>
Cc: Leslie Huhn <manager@lowersaucontownship.org>; Richard M. Bodner <rickbodner@hotmail.com>
Subject: RE: Minor Permit Mod. - Cell 4-F, MSE Wall

Chris – just wanted to shoot you an email confirming our conversation of a few minutes ago, that no building permit is required for the MSE wall for the SE Realignment or the northern MSE wall associated with Cell 4F. And also to confirm that, regarding the scale house, I'm working with AnnaMarie from Key Codes to determine what has been done by them to date and determine next steps. I'll continue to keep you posted on that.

Please give me a shout if you have any questions.

Thanks,

Maryanne

From: Chris Garges [mailto:zoning@lowersaucontownship.org]
Sent: Tuesday, October 17, 2017 9:46 AM
To: mgarber@landairwater.com; Linc Treadwell (lincwork@verizon.net) <lincwork@verizon.net>
Cc: Leslie Huhn <manager@lowersaucontownship.org>
Subject: FW: Minor Permit Mod. - Cell 4-F, MSE Wall

Maryanne / Linc:

This email refers to a permit being required for the other MSE wall. Is that completed?

Christopher Garges

Zoning Officer

Lower Saucon Township

610-865-3291

From: James Birdsall [mailto:jbirdsall@hanovereng.com]
Sent: Tuesday, March 29, 2011 8:34 AM
To: 'p deLeon'; Chris Garges; 'Chris Taylor'; 'Jake Schray'; 'Lauressa McNemar'; 'Rich Sichler'; 'Scott Brown (E-mail)'
Cc: Manager; Leslie Huhn; 'Brien Kocher'; 'Dan Miller'
Subject: RE: Minor Permit Mod. - Cell 4-F, MSE Wall

Dear Pris, The normal next steps are that the Developer's engineer gets the final plan sets etc. to Hanover Engineering with all the proper owner signatures. We check to make sure all the conditions of Council approval of Feb 16th , including legal and financial conditions, are met and then we start the plans for Township Signatures and recording. I assume this plan would follow the same process. Rick Bodnar has already discussed this with Dan Miller, as to what exact plans are needed.

After recording---- the owner could apply for the permit to build the wall.

Please let me know if you have any questions. Jim

From: p deLeon [mailto:PMdeLeon@aol.com]
Sent: Tuesday, March 29, 2011 12:12 AM
To: 'Chris Garges'; 'Chris Taylor'; 'Jake Schray'; 'Jim Birdsall (E-mail)'; 'Lauressa McNemar'; 'Rich Sichler'; 'Scott Brown (E-mail)'; 'p deLeon'
Cc: 'Manager'; 'Leslie Huhn'
Subject: RE: Minor Permit Mod. - Cell 4-F, MSE Wall

Hi!

How are we going to handle this minor permit mod?

Priscilla deLeon

Email: pmdeleon@aol.com

Cell: 610.216.0566, Home: 610.868.8745, Fax: 610.868.7955

From: Administrative Assistant [mailto:AdminAsst@lowersaucontownship.org]
Sent: Monday, March 28, 2011 3:26 PM
To: Chris Garges; Brien Kocher; Judy Stern Goldstein; Linc Treadwell (office); Glenn Kern; Glenn Kern (E-mail); Priscilla deLeon (E-mail); Priscilla Deleon; Ron Horiszny; Ron Horiszny; Sandra Yerger (E-mail); Sandy Yerger; Tom Maxfield (E-mail); Tom Maxfield; Allan Johnson ; Colin Guerra; Dru Germanoski; Glenn Kaye (GMKMD@aol.com); Karen Mallo (tkmallo@comcast.net); Laura Ray (maxandcabo@yahoo.com); Tara Jain; Tara Jain; Ted Beardsley; Tom McCormick (mccormickesq@gmail.com); Chris Garges; Chris Taylor; Haz Hijazi (thehijazis@hotmail.com); Jake Schray; Jim Birdsall (E-mail); Lauressa McNemar; Rich Sichler; Scott Brown (E-mail)
Cc: Manager; Leslie Huhn
Subject: Minor Permit Mod. - Cell 4-F, MSE Wall

Please find attached the subject letter from PA DEP.

Diane Palik

Administrative Assistant

Lower Saucon Township

3700 Old Philadelphia Pike

Bethlehem, PA 18015

(610) 625-8735

=

Polyline Area: 25989 sq ft, 1 acres
Polyline Perimeter: 705 ft

BETHLEHEM LANDFILL COMPANY
NORTHERN REALIGNMENT
Engineer's Opinion of Public Improvement Costs (Landscaping)
October 2020

ITEM	DESCRIPTION	QUANTITY	UNITS	UNIT PRICE	TOTAL PRICE
	Deciduous Trees				
OV	Ostrya virginiana / American Hophornbeam 1 1/2" Caliper B&B	30	EA	$ 147.00	$ 4,410.00
CC	Cercis canadensis / Eastern Redbud Multi-trunk 1 1/2" Caliper B&B	27	EA	$ 84.00	$ 2,268.00
	Evergreens				
IO	Ilex opaca / American Holly 5' Ht. B&B	36	EA	$ 63.00	$ 2,268.00
JV	Juniperus virginiana / Eastern Red Cedar 5' Ht. Container	69	EA	$ 63.00	$ 4,347.00
	Installation of Plantings				
P-1	Hardwood Mulch *	41	CY	$ 21.00	$ 861.00
P-2	Tree Planting Complete in Place in accordance w/ Land Development Plan (Excavation/Backfill, Staking, Wire, Wrap, Fertilizer)	162	EA	$ 78.75	$ 12,757.50
			Sub Total		$ 26,911.50
			Total Bond (110%)		$ 29,602.65

*based upon 0.25 CY per tree

RECORDERS OFFICE
NORTHAMPTON COUNTY
PENNSYLVANIA

INSTRUMENT NUMBER
1994016328
RECORDED ON
Apr 22, 1994
2:52:30 PM
STATE WRIT TAX $ 0.50
RECORDING FEES $ 23.00
TOTAL $23.50

SCENIC AND CONSERVATION EASEMENT

FORMER HELMS PROPERTY

ADJACENT TO CITY OF BETHLEHEM LANDFILL

WHEREAS, the City of Bethlehem ("City") and the Township of Lower Saucon ("Township") desire to cooperate in the proper expansion of the City of Bethlehem Landfill ("Landfill") located on Applebutter Road in the Township; and

WHEREAS, the City and Township have agreed in Section III - Intergovernmental Issues, Item 4, that the City buffer land purchased on the North side of the Landfill, i.e., the former Helms property, should be protected with a conservation and scenic easement; and

WHEREAS, the City and Township have agreed that the City is allowed ingress, egress and regress over the easement area to perform groundwater testing and pollution abatement projects.

NOW, THEREFORE, IT IS AGREED:

1. That the consideration for this agreement is the mutual covenants and promises contained herein.

2. That the City grants to the Township a restrictive easement for scenic and conservation purposes on the tract of approximately sixty-six (66) acres as more fully described in the exhibits attached hereto and marked as Exhibits "3" and "4."

3. The City recognizes the area as identified above is zoned "RA" and will only perform those activities permitted in such zoning, and in accordance with any amendments by which the City or its successors are obligated to comply in accordance with the provisions of the Municipalities Planning Code and applicable state law. The City further agrees it will not engage in any landfill activities on the property. The City and the Township recognize, however, that the City retains the right and permission to undertake groundwater testing activities and water pollution abatement activities on this property.

Also Known As Northampton County
Uniform Parcel Identifier:
Map N8 Block 14 Lot 1

VOL: 1994-6

012081

4. The City has granted (Supplemental Agreement, City and Township, Item 14) a woodlands protection easement for approximately eight (8) acre area as attached as Exhibits "1" and "2," hereto. The woodlands protection easement provides that the woodlands shall be preserved as undisturbed woodlands, except for the removal of dead or diseased trees, and/or except for normal removal of trees for prudent forest management to allow for proper tree growth. The City shall retain the rights of ingress, egress and regress over the easement area, and the further right to perform groundwater testing and abatement in the easement area.

5. Surface mining and other extractive activities are strictly prohibited on the easement area.

6. The City of Bethlehem shall not perform any activity other than those stated in this easement agreement or any activity that may in any way be in contradiction to the guidelines and rules of the Delaware and Lehigh Canal National Heritage Corridor and State Heritage Park.

7. The City shall retain the right to exclude any member of the public from trespassing on the easement area.

8. The restrictions and easements shall constitute a covenant running with all of the property described herein and shall be binding upon the City and all other persons and parties claiming through the City herein, and for the benefit of and limitation upon all future owners of said land and premises, this declaration of restrictions being designed for the purposes of assuring the preservation of the Delaware and Lehigh Canal National Heritage Corridor and State Heritage Park; and, during such operation of the Landfill to as great a degree as possible, to preserve the original character and scenic nature of the land.

9. The Township shall have the right to assign this restrictive easement with the prior written approval of the City, which said approval shall not be unreasonably withheld.

IN WITNESS WHEREOF, the undersigned have executed this

Easement on behalf of the City and the Township, intending to legally bind the parties to its terms.

CITY OF BETHLEHEM

Controller

MAR 16 1994

By: _____
Kenneth R. Smith
Mayor

TOWNSHIP OF LOWER SAUCON

Secretary

By: _____
Priscilla deLeon
President of Council

COMMONWEALTH OF PENNSYLVANIA)
: SS:
COUNTY OF Northampton)

On this 16th day of March, 1994, before me, Cynthia A Schick, the undersigned officer, personally appeared KENNETH R. SMITH, Mayor of the City of Bethlehem, Pennsylvania, known to me to be the person described in the foregoing instrument, and acknowledged that he executed the same in his official capacity therein stated and for the purposes therein contained.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal.

Cynthia A Schick

Notarial Seal
Cynthia A Schick, Notary Public
Bethlehem, Northampton County
My Commission Expires Aug 12, 1994

COMMONWEALTH OF PENNSYLVANIA)
: SS:
COUNTY OF)

On this 16th day of March, 1994, before me, Martha L. Chase, the undersigned officer, personally appeared PRISCILLA deLEON, President of Council of the Township of Lower Saucon, Pennsylvania, known to me to be the person described in the foregoing instrument, and acknowledged that she executed the same in her official capacity therein stated and for the purposes therein contained.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal.

Martha L. Chase

Notarial Seal
Martha L. Chase, Notary Public
Lower Saucon Twp., Northampton County
My Commission Expires Jan. 23, 1995
Member, Pennsylvania Association of Notaries

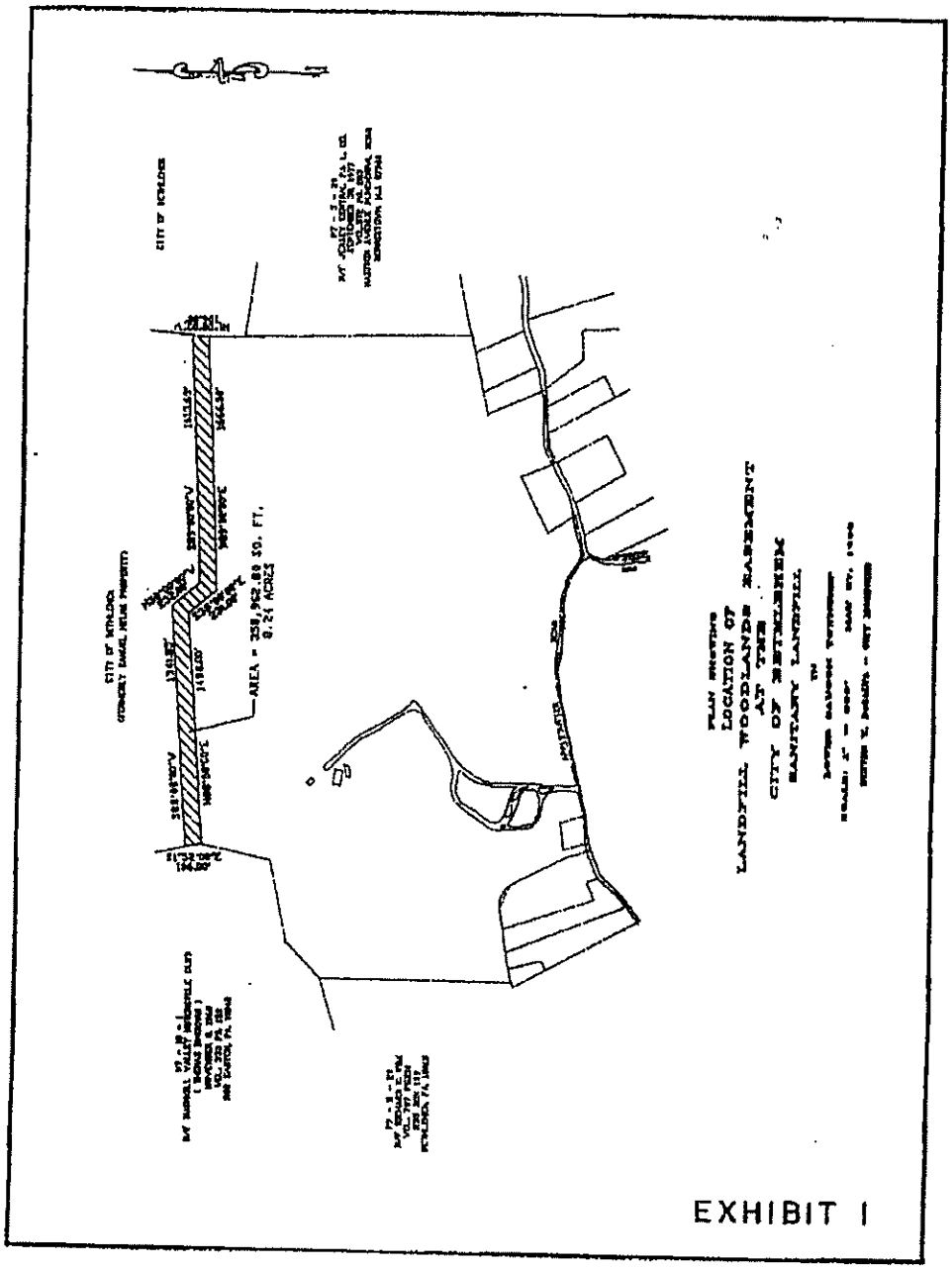

PLAN SHOWING
LOCATION OF
LANDFILL WOODLANDS EASEMENT
AT THE
CITY OF BETHLEHEM
SANITARY LANDFILL
AREA = 359,962.89 SQ. FT.
8.24 ACRES

EXHIBIT I

DESCRIPTION OF
LANDFILL WOODLANDS EASEMENT

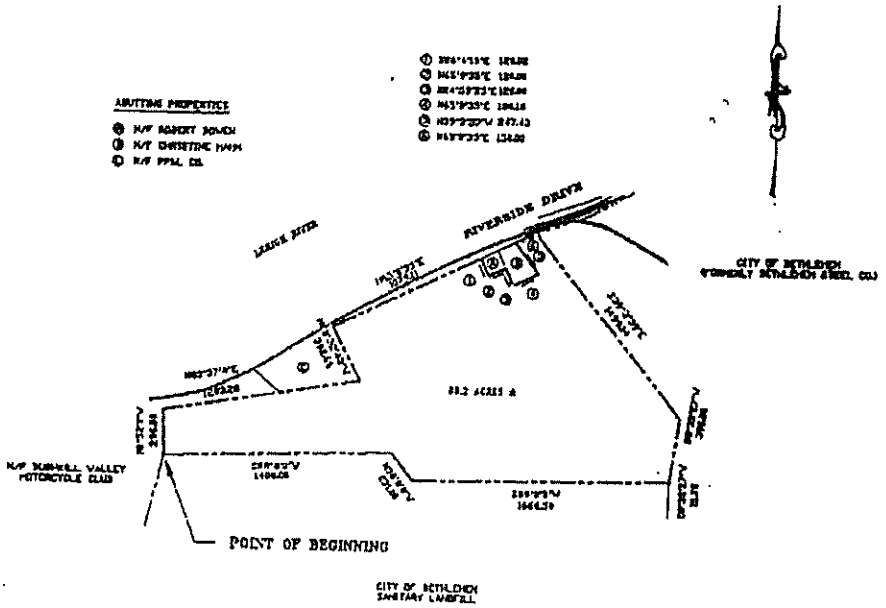
All that certain portion of lot or parcel to be dedicated as a Landfill Woodlands Easement, located in Lower Saucon Township, County of Northampton, Commonwealth of Pennsylvania, bounded and described as follows to wit:

Beginning at a point along the northwardly property line of the original City of Bethlehem Landfill, being a common point between the Bushkill Valley Motorcycle Club, the former Samuel Helms property (now City of Bethlehem) and the original City of Bethlehem Landfill, thence in an eastwardly direction along the northwardly property line of the original City of Bethlehem Landfill, North Eighty-Eight Degrees Eight Minutes East (N 88°-08'-00"E) One Thousand Four Hundred Eighty-Eight Feet (1,488.00') to a point, thence South Thirty-Eight Degrees East (S 38°-00'-00" E) Two Hundred Thirty-One Feet (231.00') to a point, thence North Eighty-Nine Degrees East (N 89°-00'-00" E) One Thousand Six Hundred Sixty-Six and Fifty One-Hundredths Feet (1,666.50') to a point, thence North One Degree West (N 01°-00'-00" W) One Hundred and Six Feet (106.00') to a point, thence South Eighty-Nine Degrees West (S 89°-00'-00" W) One Thousand Six Hundred Thirteen and Sixty-Five One-Hundredths Feet (1,613.65') to a point, thence North Thirty-Eight Degrees West (N 38°-00'-00" W) Two Hundred Thirty-Two Feet (232.00') to a point, thence South Eighty-Eight Degrees Eight Minutes West (S 88°-08'-00" W) One Thousand Five Hundred Forty-One and Eighty-Five One-Hundredths Feet (1,541.85') to a point, thence South One Degree Fifty-Two Minutes East (S 01°-52'-00" E) One Hundred Six Feet (106.00') to a point, said point being the point the place of beginning; containing 358,962.80 Sq. Ft. or 8.24 Acres.

The entire One hundred and Six (106.00') Foot wide Woodland Easement is being Dedicated from the former Samuel Helms Property.

All of which is more fully shown upon the map or plan entitled " Plan Showing Location of Woodlands Easement at the City of Bethlehem Sanitary Landfill in Lower Saucon Township Scale 1" = 800' May 27, 1993 Steven W. DeSalva - City Engineer", a copy of which is on file in the office of the City Engineer of Bethlehem, Pennsylvania.

EXHIBIT 2



PLAN SHOWING
SCENIC & CONSERVATION
EASEMENT
IN
LOWER SAUCON TOWNSHIP
OWNED BY CITY OF BETHLEHEM
(FORMERLY HELMS PROPERTY)

STEVEN W. DeSALVA - CITY ENGINEER
SCALE 1" = 800'
JUNE 29, 1993

EXHIBIT "3"

VOL: 1994-6

012057

EXHIBIT "4"

DESCRIPTION OF
SCENIC & CONSERVATION EASEMENT
ON PROPERTY OF CITY OF BETHLEHEM
(FORMERLY KNOWN AS THE SAMUEL HELMS PROPERTY)

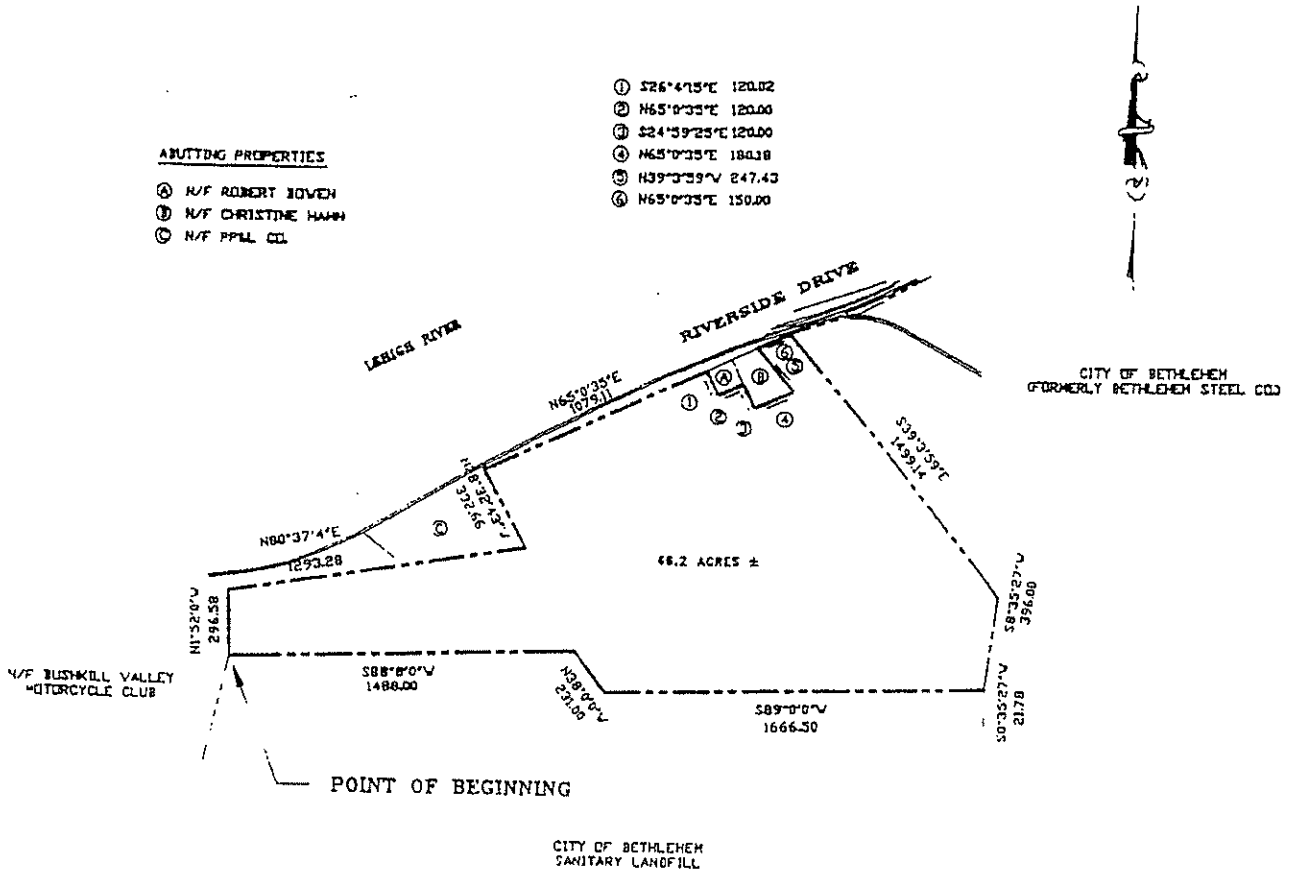
All that certain lot or parcel of land to be dedicated as a Scenic & Conservation Easement, situate along the south side of Riverside Drive, in Lower Saucon Township, County of Northampton, Commonwealth of Pennsylvania, bounded and described as follows to wit:

Beginning at a point, said point being the northwest corner of the original City of Bethlehem Landfill, also being a common point between the Bushkill Valley Motorcycle Club, the original City of Bethlehem Landfill, and the southwest corner of the former Samuel Helms property (now the City of Bethlehem) the property described herein, thence in a northwardly direction North One Degree Fifty-two Minutes Zero Seconds West (N 01°52'00" W) Two Hundred Ninety-six and Fifty-eight One-Hundredths Feet (296.58') to a point, thence North Eighty Degrees Thirty-seven Minutes Four Seconds East (N 80°37'04" E) One Thousand Two Hundred Ninety-three and Twenty-eight One-Hundredths Feet (1,293.28') to a point, thence North Twenty-eight Degrees Thirty-two Minutes Forty-three Seconds West (N 28°32'43" W) Three Hundred Ninety-two and Sixty-six One-Hundredths Feet (392.66') to a point, thence North Sixty-five Degrees Zero Minutes Thirty-five Seconds East (N 65°00'35" E) One Thousand Seventy-nine and Eleven Hundredths Feet (1,079.11') to a point, thence South Twenty-six Degrees Four Minutes Fifteen Seconds East (S 26°04'15" E) One Hundred Twenty and Two One-Hundredths Feet (120.02') to a point, thence North Sixty-five Degrees Zero Minutes Twenty-five Seconds East (N 65°00'25" E) One Hundred Twenty Feet (120.00') to a point, thence South Twenty-four Degrees Fifty-nine Minutes Twenty-five Seconds East (S 24°59'25" E) One Hundred Twenty Feet (120.00') to a point,thence North Sixty-five Degrees Zero Minutes Thirty-five Seconds East (N 65°00'35" E) One Hundred Eighty and Eighteen One-Hundredths Feet (180.18') to a point, thence North Thirty-nine Degrees Three Minutes Fifty-nine Seconds West (N 39°03'59" W) Two Hundred Forty-seven and Forty-three One-Hundredths Feet (247.43') to a point, thence North Sixty-five Degrees Zero Minutes Thirty-five Seconds East (N 65°00'35" E) One Hundred Fifty Feet (150.00') to a point, thence South Thirty-nine Degrees Three Minutes Fifty-nine Seconds East (S 39°03'59" E) One Thousand Four Hundred Ninety-nine and Fourteen One-Hundredths Feet (1,499.14') to a point, thence South Eight Degrees Thirty-five Minutes Twenty-seven Seconds West (S 08°35'27" W) Three Hundred Ninety-six Feet (396.00') to a point, thence South Zero Degrees Thirty-five Minutes Twenty-seven Seconds West (S 00°35'27" W) Twenty-one and Seventy-

eight One-Hundredths Feet (21.78') to a point, thence South Eighty-nine Degrees Zero Minutes Zero Seconds West (S 89°00'00" W) One Thousand Six Hundred Sixty-six and Fifty One- Hundredths Feet (1,666.50') to a point, thence North Thirty-eight Degrees Zero Minutes Zero Seconds West (N 38°00'00" W) Two Hundred Thirty-one Feet (231.00') to a point, thence South Eighty-eight Degrees Eight Minutes Zero Seconds West (S 88°08'00" W) One Thousand Four Hundred Eighty-eight Feet (1,488.00') to a point, said point being the point the place of beginning, containing 66.2 Acres ±.

Bounded on the north by Riverside Drive, on the east by lands of City of Bethlehem (formerly Bethlehem Steel Co.), on the south by the City of Bethlehem Landfill and on the west by Bushkill Valley Motorcycle Club.

All of which is more fully shown upon the map or plan entitled "PLAN SHOWING SCENIC & CONSERVATION EASEMENT IN LOWER SAUCON TOWNSHIP OWNED BY THE CITY OF BETHLEHEM (FORMERLY HELMS PROPERTY) STEVEN W. DESALVA - CITY ENGINEER SCALE 1" = 800' JUNE 28, 1993 EXHIBIT "3", a copy of which is on file in the office of the City Engineer of Bethlehem, Pennsylvania.



PLAN SHOWING

SCENIC & CONSERVATION EASEMENT

IN

LOWER SAUCON TOWNSHIP

OWNED BY CITY OF BETHLEHEM
(FORMERLY HELMS PROPERTY)

STEVEN W. DeSALVA – CITY ENGINEER

SCALE 1" = 800'

JUNE 28, 1993

EXHIBIT "3"

EXHIBIT "4"

DESCRIPTION OF
SCENIC & CONSERVATION EASEMENT
ON PROPERTY OF CITY OF BETHLEHEM
(FORMERLY KNOWN AS THE SAMUEL HELMS PROPERTY)

All that certain lot or parcel of land to be dedicated as a Scenic & Conservation Easement, situate along the south side of Riverside Drive, in Lower Saucon Township, County of Northampton, Commonwealth of Pennsylvania, bounded and described as follows to wit:

Beginning at a point, said point being the northwest corner of the original City of Bethlehem Landfill, also being a common point between the Bushkill Valley Motorcycle Club, the original City of Bethlehem Landfill, and the southwest corner of the former Samuel Helms property (now the City of Bethlehem) the property described herein, thence in a northwardly direction North One Degree Fifty-two Minutes Zero Seconds West (N 01°52'00" W) Two Hundred Ninety-six and Fifty-eight One-Hundredths Feet (296.58') to a point, thence North Eighty Degrees Thirty-seven Minutes Four Seconds East (N 80°37'04" E) One Thousand Two Hundred Ninety-three and Twenty-eight One-Hundredths Feet (1,293.28') to a point, thence North Twenty-eight Degrees Thirty-two Minutes Forty-three Seconds West (N 28°32'43" W) Three Hundred Ninety-two and Sixty-six One-Hundredths Feet (392.66') to a point, thence North Sixty-five Degrees Zero Minutes Thirty-five Seconds East (N 65°00'35" E) One Thousand Seventy-nine and Eleven Hundredths Feet (1,079.11') to a point, thence South Twenty-six Degrees Four Minutes Fifteen Seconds East (S 26°04'15" E) One Hundred Twenty and Two One-Hundredths Feet (120.02') to a point, thence North Sixty-five Degrees Zero Minutes Twenty-five Seconds East (N 65°00'25" E) One Hundred Twenty Feet (120.00') to a point, thence South Twenty-four Degrees Fifty-nine Minutes Twenty-five Seconds East (S 24°59'25" E) One Hundred Twenty Feet (120.00') to a point, thence North Sixty-five Degrees Zero Minutes Thirty-five Seconds East (N 65°00'35" E) One Hundred Eighty and Eighteen One-Hundredths Feet (180.18') to a point, thence North Thirty-nine Degrees Three Minutes Fifty-nine Seconds West (N 39°03'59" W) Two Hundred Forty-seven and Forty-three One-Hundredths Feet (247.43') to a point, thence North Sixty-five Degrees Zero Minutes Thirty-five Seconds East (N 65°00'35" E) One Hundred Fifty Feet (150.00') to a point, thence South Thirty-nine Degrees Three Minutes Fifty-nine Seconds East (S 39°03'59" E) One Thousand Four Hundred Ninety-nine and Fourteen One-Hundredths Feet (1,499.14') to a point, thence South Eight Degrees Thirty-five Minutes Twenty-seven Seconds West (S 08°35'27" W) Three Hundred Ninety-six Feet (396.00') to a point, thence South Zero Degrees Thirty-five Minutes Twenty-seven Seconds West (S 00°35'27" W) Twenty-one and Seventy-

eight One-Hundredths Feet (21.78') to a point, thence South Eighty-nine Degrees Zero Minutes Zero Seconds West (S 89°00'00" W) One Thousand Six Hundred Sixty-six and Fifty One- Hundredths Feet (1,666.50') to a point, thence North Thirty-eight Degrees Zero Minutes Zero Seconds West (N 38°00'00" W) Two Hundred Thirty-one Feet (231.00') to a point, thence South Eighty-eight Degrees Eight Minutes Zero Seconds West (S 88°08'00" W) One Thousand Four Hundred Eighty-eight Feet (1,488.00') to a point, said point being the point the place of beginning, containing 66.2 Acres ±.

Bounded on the north by Riverside Drive, on the east by lands of City of Bethlehem (formerly Bethlehem Steel Co.), on the south by the City of Bethlehem Landfill and on the west by Bushkill Valley Motorcycle Club.

All of which is more fully shown upon the map or plan entitled "PLAN SHOWING SCENIC & CONSERVATION EASEMENT IN LOWER SAUCON TOWNSHIP OWNED BY THE CITY OF BETHLEHEM (FORMERLY HELMS PROPERTY) STEVEN W. DESALVA - CITY ENGINEER SCALE 1" = 800' JUNE 28, 1993 EXHIBIT "3", a copy of which is on file in the office of the City Engineer of Bethlehem, Pennsylvania.

COMMONWEALTH OF PENNSYLVANIA)
: SS:
COUNTY OF)

On this 12th day of November, 1993, before me, Martha L. Chase, a Notary Public, personally appeared Neil J. Ortwein who duly acknowledged himself to be the Acting President (title) of Lower Saucon Twp., and that he, as such Acting President (title), being authorized to do so, executed the foregoing instrument for the purpose therein contained, by signing the name of the Corporation by himself as Acting President (title).

WITNESS my hand and official seal.

Martha L. Chase

Notarial Seal
Martha L. Chase, Notary Public
Lower Saucon Twp., Northampton County
My Commission Expires Jan. 23, 1995
Member, Pennsylvania Association of Notaries

COMMONWEALTH OF PENNSYLVANIA)
: SS:
COUNTY OF NORTHAMPTON)

On this 12th day of November, 1993, before me, Cynthia A. Schick, the undersigned officer, personally appeared KENNETH R. SMITH, Mayor of the City of Bethlehem, Pennsylvania, known to me to be the person described in the foregoing instrument, and acknowledged that he executed the same in his official capacity therein stated and for the purposes therein contained.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

Cynthia A. Schick

Notarial Seal
Cynthia A. Schick, Notary Public
[illegible]

RECORDERS OFFICE
NORTHAMPTON COUNTY
PENNSYLVANIA

INSTRUMENT NUMBER
1994016325
RECORDED ON
Apr 22, 1994
2:50:52 PM
STATE WRIT TAX $ 0.50
RECORDING FEES $ 19.00
TOTAL $19.50

I Hereby CERTIFY that this document is recorded in the Recorder's Office of Northampton County, Pennsylvania.

SCENIC AND CONSERVATION EASEMENT

FORMER BETHLEHEM STEEL PROPERTY

ADJACENT TO CITY OF BETHLEHEM LANDFILL

WHEREAS, the City of Bethlehem ("City") and the Township of Lower Saucon ("Township") desire to cooperate in the proper expansion of the City of Bethlehem Landfill ("Landfill") located on Applebutter Road in the Township; and

WHEREAS, the City and Township have agreed in Section III - Intergovernmental Issues, Item 4, that the City buffer land purchased on the North side of the Landfill, i.e., the former Bethlehem Steel property, should be protected with a conservation and scenic easement; and

WHEREAS, the City and Township have agreed that the City is allowed ingress, egress and regress over the easement area to perform groundwater testing and pollution abatement projects.

NOW, THEREFORE, IT IS AGREED:

1. That the consideration for this agreement is the mutual covenants and promises contained herein.

2. That the City grants to the Township a restrictive easement for scenic and conservation purposes on the tract of approximately one hundred forty-two (142) acres as more fully described in the exhibits attached hereto and marked as Exhibits "1" and "2."

3. The City recognizes the area as identified above is zoned "RA" and will only perform those activities permitted in such zoning, and in accordance with any amendments by which the City or its successors are obligated to comply in accordance with the provisions of the Municipalities Planning Code and applicable state law. The City further agrees it will not engage in any landfill activities on the property. The City and the Township recognize, however, that the City retains the right and permission to undertake groundywater testing activities and water pollution abatement activities on this property.

Also Known As Northampton County
Uniform Parcel Identifier:
Map N8 Block 14 Lot 2

VOL: 1994-8

012074

4. The Township recognizes that the City police department operates a firing range and training facility on a portion of the parcel and that there further exists a gun club on a portion of the parcel. The Township agrees that such facilities and operations may continue in their present form and condition. In the event anyone wishes to modify the operations or facilities, such modification shall be undertaken in accordance with the Township ordinances. In the event the Township ordinances require approval of the modification, such approval shall not be unreasonably withheld.

5. Surface mining and other extractive activities are strictly prohibited on the easement area.

6. The City of Bethlehem shall not perform any activity other than those stated in this easement agreement or any activity that may in any way be in contradiction to the guidelines and rules of the Delaware and Lehigh Canal National Heritage Corridor and State Heritage Park.

7. The City shall retain the right to exclude any member of the public from trespassing on the easement area.

8. The restrictions and easements shall constitute a covenant running with all of the property described herein and shall be binding upon the City and all other persons and parties claiming through the City herein, and for the benefit of and limitation upon all future owners of said land and premises, this declaration of restrictions being designed for the purposes of assuring the preservation of the Delaware and Lehigh Canal National Heritage Corridor and State Heritage Park; and, during such operation of the Landfill to as great a degree as possible, to preserve the original character and scenic nature of the land.

9. The Township shall have the right to assign this restrictive easement with the prior written approval of the City, which said approval shall not be unreasonably withheld.

IN WITNESS WHEREOF, the undersigned have executed this

Easement on behalf of the City and the Township, intending to legally bind the parties to its terms.

CITY OF BETHLEHEM

Controller

MAR 16 1994

By: _____
Kenneth R. Smith
Mayor

TOWNSHIP OF LOWER SAUCON

Secretary

By: _____
Priscilla deLeon
President of Council

COMMONWEALTH OF PENNSYLVANIA)
: SS:
COUNTY OF Northampton)

On this 16th day of March, 1994, before me, Cynthia A. Schick, the undersigned officer, personally appeared KENNETH R. SMITH, Mayor of the City of Bethlehem, Pennsylvania, known to me to be the person described in the foregoing instrument, and acknowledged that he executed the same in his official capacity therein stated and for the purposes therein contained.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal.

Cynthia A Schick

Notarial Seal
Cynthia A. Schick, Notary Public
Bethlehem, Northampton County
My Commission Expires Sept. 2, 1994

COMMONWEALTH OF PENNSYLVANIA)
: SS:
COUNTY OF)

On this 16th day of March, 1994, before me, MARTHA L. Chase, the undersigned officer, personally appeared PRISCILLA deLEON, President of Council of the Township of Lower Saucon, Pennsylvania, known to me to be the person described in the foregoing instrument, and acknowledged that she executed the same in her official capacity therein stated and for the purposes therein contained.

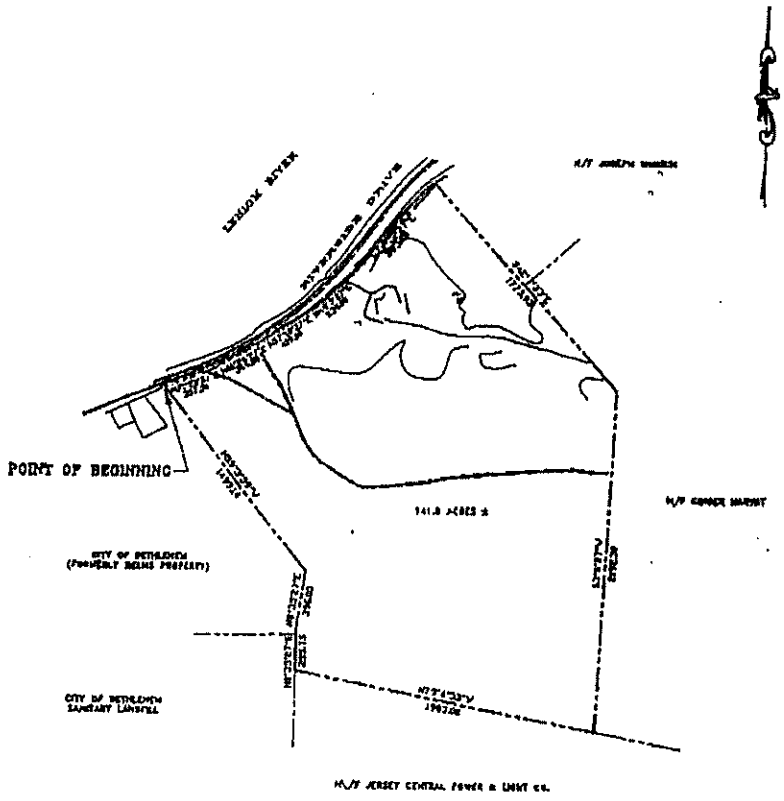
IN WITNESS WHEREOF, I have hereunto set my hand and official seal.

Martha L. Chase

Notarial Seal
Martha L. Chase, Notary Public
Lower Saucon Twp., Northampton County
My Commission Expires Jan. 23, 1995
Member, Pennsylvania Association of Notaries

VOL: 1994-6

012077



PLAN SHOWING

SCENIC & CONSERVATION EASEMENT

IN

LOWER SAUCON TOWNSHIP

OWNED BY CITY OF BETHLEHEM
(FORMERLY BETHLEHEM STEEL CO.)

STEVEN W. DeSALVA – CITY ENGINEER

SCALE 1" = 800'

JUNE 28, 1993

EXHIBIT "1"

VOL: 1984-6

012078

EXHIBIT "2"

DESCRIPTION OF
SCENIC & CONSERVATION EASEMENT
ON PROPERTY OF CITY OF BETHLEHEM
(FORMERLY KNOWN AS BETHLEHEM STEEL COMPANY PROPERTY)

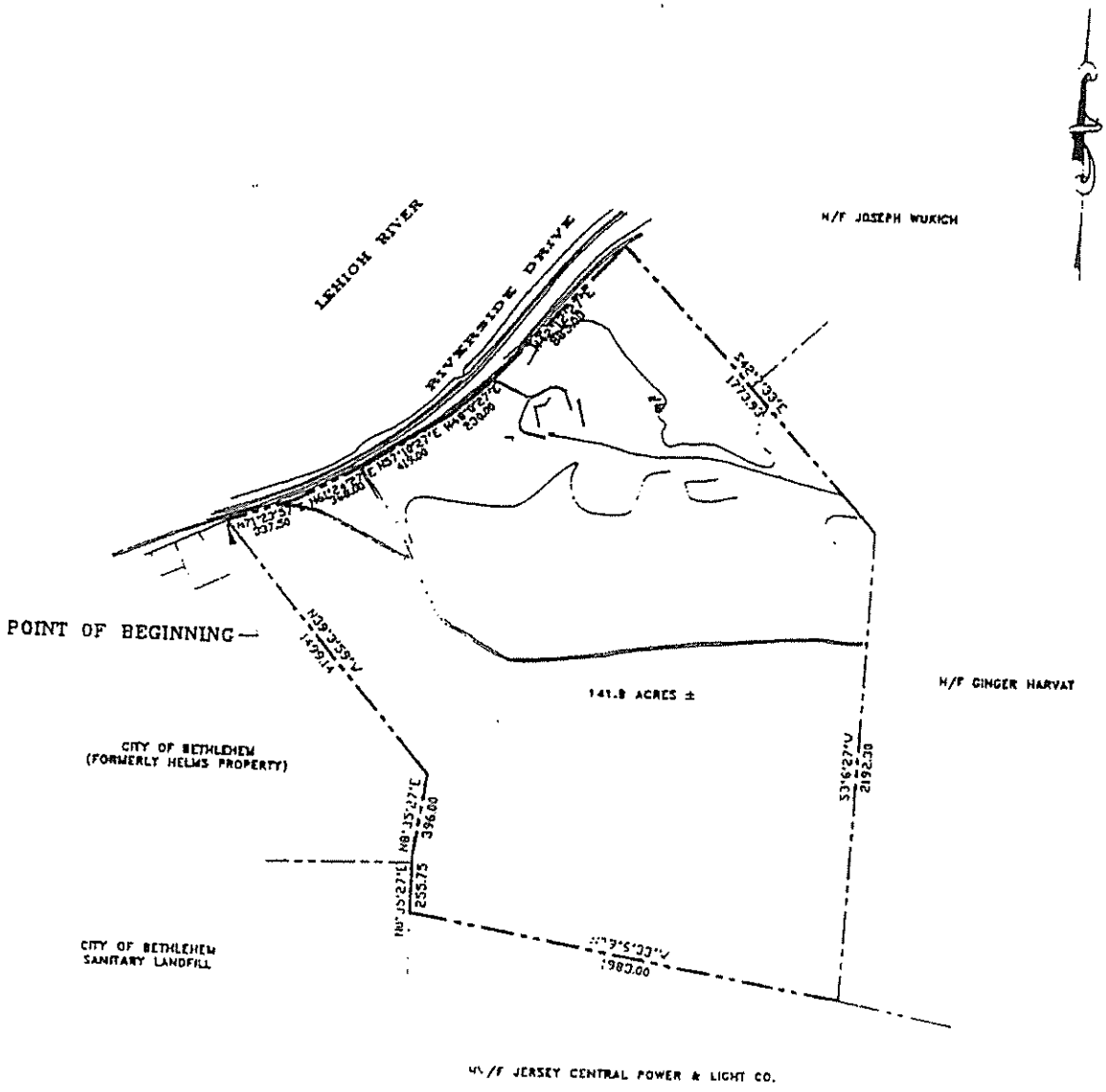
All that certain lot or parcel of land to be dedicated as a Scenic & Conservation Easement, situate along the south side of Riverside Drive, in Lower Saucon Township, County of Northampton, Commonwealth of Pennsylvania, bounded and described as follows to wit:

Beginning at a point, said point being the common point between the northeast corner of property of the City of Bethlehem (formerly known as Samuel Helms property) and the northwest corner of property of the City of Bethlehem (formerly known as Bethlehem Steel Company property) the property described herein, thence in an eastwardly direction by the five (5) following courses and distances: 1) North Seventy-one degrees Twenty-three minutes Fifty-seven seconds East (N 71°23'57"E) Three hundred Thirty-seven and Fifty one-hundredths feet (337.50') to a point, 2) North Sixty-one degrees Twenty-four minutes Twenty-seven seconds East (N 61°24'27"E) Three hundred sixty eight feet (368.00') to a point, 3) North Fifty-seven degrees Ten minutes Twenty-seven seconds East (N 57°10'27"E) Four hundred nineteen feet (419.00') to a point, 4) North Forty-eight degrees Zero minutes Twenty-seven seconds East (N 48°00'27"E) Two hundred thirty feet (230.00') to a point, 5) North Forty-two degrees Twelve minutes Twenty-seven seconds East (N 42°12'27"E) Eight Hundred eighty-three feet (883.00') to a point, said point being on the common property line of Joseph Wukich, thence in an southwardly direction along property of Joseph Wukich South Forty-two degrees Seven minutes Thirty-three seconds East (S 42°07'33"E) One thousand Seven hundred Seventy-three and Ninety-three one-hundredths feet (1,773.93') to a point, thence continuing in a southwardly direction along lands of Ginger Harvat South Three degrees Six minutes Twenty-seven seconds West (S 3°06'27"W) Two thousand one hundred Ninety-two and Thirty one-hundredths feet (2,192.30') to a point on the common property line of Ginger Harvat and Jersey Central Power and Light Company, thence in a westwardly direction along property of Jersey Central Power and Light Company North Seventy-nine degrees Six minutes Thirty-three seconds West (N 79°06'33"W) One thousand Nine hundred Eighty-three feet (1,983.00') to a point on the common property line of the City of Bethlehem Landfill, thence in a northwardly direction along property of the City of Bethlehem Landfill North Zero degrees Thirty-five minutes Twenty-seven seconds East (N 0°35'27"E) Two hundred Fifty-five and

Seventy-five one-hundredths feet (255.75') to a point, thence continuing in a northwardly direction along property of City of Bethlehem (formerly Samuel Helms property) North Eight degrees Thirty-five minutes Twenty-seven seconds East (N 8°35'27"E) Three hundred Ninety-six feet (396.00') to a point, thence continuing in a northwardly direction along property of City of Bethlehem (formerly Samuel Helms property) North Thirty-nine degrees Three minutes Fifty-nine seconds West (N 39°03'59"W) One-thousand Four hundred Ninety-nine and Fourteen one-hundredths feet (1,499.14') to a point, said point being the place of beginning, containing 141.9 Acres ±.

Bounded on the north by Riverside Drive, on the east by lands of Joseph Wukich and lands of Ginger Harvat, on the south by lands of Jersey Central Power and Light Company, on the west by lands of the City of Bethlehem Landfill and City of Bethlehem (formerly Samuel Helms property).

All of which is more fully shown upon the map or plan entitled "PLAN SHOWING SCENIC & CONSERVATION EASEMENT IN LOWER SAUCON TOWNSHIP OWNED BY THE CITY OF BETHLEHEM (FORMERLY BETHLEHEM STEEL PROPERTY) STEVEN W. DESALVA - CITY ENGINEER SCALE 1" = 800' JUNE 28, 1993 EXHIBIT "1", a copy of which is on file in the office of the City Engineer of Bethlehem, Pennsylvania.



PLAN SHOWING

SCENIC & CONSERVATION EASEMENT

IN

LOWER SAUCON TOWNSHIP

OWNED BY CITY OF BETHLEHEM
(FORMERLY BETHLEHEM STEEL CO.)

STEVEN W. DeSALVA - CITY ENGINEER

SCALE 1" = 800'

JUNE 28, 1993

EXHIBIT "1"

EXHIBIT "2"

DESCRIPTION OF
SCENIC & CONSERVATION EASEMENT
ON PROPERTY OF CITY OF BETHLEHEM
(FORMERLY KNOWN AS BETHLEHEM STEEL COMPANY PROPERTY)

All that certain lot or parcel of land to be dedicated as a Scenic & Conservation Easement, situate along the south side of Riverside Drive, in Lower Saucon Township, County of Northampton, Commonwealth of Pennsylvania, bounded and described as follows to wit:

Beginning at a point, said point being the common point between the northeast corner of property of the City of Bethlehem (formerly known as Samuel Helms property) and the northwest corner of property of the City of Bethlehem (formerly known as Bethlehem Steel Company property) the property described herein, thence in an eastwardly direction by the five (5) following courses and distances: 1) North Seventy-one degrees Twenty-three minutes Fifty-seven seconds East (N 71°23'57"E) Three hundred Thirty-seven and Fifty one-hundredths feet (337.50') to a point, 2) North Sixty-one degrees Twenty-four minutes Twenty-seven seconds East (N 61°24'27"E) Three hundred sixty eight feet (368.00') to a point, 3) North Fifty-seven degrees Ten minutes Twenty-seven seconds East (N 57°10'27"E) Four hundred nineteen feet (419.00') to a point, 4) North Forty-eight degrees Zero minutes Twenty-seven seconds East (N 48°00'27"E) Two hundred thirty feet (230.00') to a point, 5) North Forty-two degrees Twelve minutes Twenty-seven seconds East (N 42°12'27"E) Eight Hundred eighty-three feet (883.00') to a point, said point being on the common property line of Joseph Wukich, thence in an southwardly direction along property of Joseph Wukich South Forty-two degrees Seven minutes Thirty-three seconds East (S 42°07'33"E) One thousand Seven hundred Seventy-three and Ninety-three one-hundredths feet (1,773.93') to a point, thence continuing in a southwardly direction along lands of Ginger Harvat South Three degrees Six minutes Twenty-seven seconds West (S 3°06'27"W) Two thousand one hundred Ninety-two and Thirty one-hundredths feet (2,192.30') to a point on the common property line of Ginger Harvat and Jersey Central Power and Light Company, thence in a westwardly direction along property of Jersey Central Power and Light Company North Seventy-nine degrees Six minutes Thirty-three seconds West (N 79°06'33"W) One thousand Nine hundred Eighty-three feet (1,983.00') to a point on the common property line of the City of Bethlehem Landfill, thence in a northwardly direction along property of the City of Bethlehem Landfill North Zero degrees Thirty-five minutes Twenty-seven seconds East (N 0°35'27"E) Two hundred Fifty-five and

Seventy-five one-hundredths feet (255.75') to a point, thence continuing in a northwardly direction along property of City of Bethlehem (formerly Samuel Helms property) North Eight degrees Thirty-five minutes Twenty-seven seconds East (N 8°35'27"E) Three hundred Ninety-six feet (396.00') to a point, thence continuing in a northwardly direction along property of City of Bethlehem (formerly Samuel Helms property) North Thirty-nine degrees Three minutes Fifty-nine seconds West (N 39°03'59"W) One-thousand Four hundred Ninety-nine and Fourteen one-hundredths feet (1,499.14') to a point, said point being the place of beginning, containing 141.9 Acres ±.

Bounded on the north by Riverside Drive, on the east by lands of Joseph Wukich and lands of Ginger Harvat, on the south by lands of Jersey Central Power and Light Company, on the west by lands of the City of Bethlehem Landfill and City of Bethlehem (formerly Samuel Helms property).

All of which is more fully shown upon the map or plan entitled "PLAN SHOWING SCENIC & CONSERVATION EASEMENT IN LOWER SAUCON TOWNSHIP OWNED BY THE CITY OF BETHLEHEM (FORMERLY BETHLEHEM STEEL PROPERTY) STEVEN W. DESALVA - CITY ENGINEER SCALE 1" = 800' JUNE 28, 1993 EXHIBIT "1", a copy of which is on file in the office of the City Engineer of Bethlehem, Pennsylvania.

LVPC
Lehigh Valley Planning Commission

GREG ZEBROWSKI
Chair

STEVEN GLICKMAN
Vice Chair

PAMELA PEARSON
Treasurer

BECKY A. BRADLEY, AICP
Executive Director

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

October 1, 2020

Mr. Craig Kologie, Chair
Lower Saucon Township Planning Commission
3700 Old Bethlehem Pike
Bethlehem, Pennsylvania 18015

Re: Bethlehem Landfill Northern Realignment
Plans Dated August 10, 2020
Lower Saucon Township
Northampton County

Dear Mr. Kologie:

The proposed storm drainage concept presented in the plans dated August 10, 2020 and storm drainage calculations dated August 2020 has been reviewed for consistency with the *Saucon Creek Watershed Act 167 Storm Water Management Ordinance*, April 1991. A checklist of the Act 167 review items is attached for your information. As indicated on the checklist, each item of the Drainage Plan has been reviewed for consistency with the Act 167 Ordinance. A brief narrative of the review findings is as follows:

> The proposed development is located within drainage districts 188, 189 and 196 of the Saucon Creek Watershed as delineated in the Act 167 Plan. As such, the runoff control criteria for district 188 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. The runoff control criterion for districts189 and 196 is a 100% Release Rate for the 2-, 10-, 25- and 100-year return period storms. Based on review of the plans and calculations, the following deficiencies are noted. Since new impervious is proposed, a comparison between the bypass in the existing condition and the proposed condition should be provided to verify that there is no increase of flow towards the Lehigh River. The basin stage-storage table in the calculations is not consistent with the contours on the plans. Therefore, the Drainage Plan has been found to be inconsistent 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.

Once the outlined issues have been addressed, the revised plans completed application form and appropriate review fee will need to be resubmitted to our office.

Please call me with any questions regarding these comments.

Sincerely yours,

Geoffrey A. Reese, PE
Director of Environmental Planning

Attachment

cc: Brien Kocher, PE, Hanover Engineering Associates, Inc.
Joseph McDowell, PE, Martin and Martin, Inc.
Northampton County Conservation District

LVPC ACT 167 REVIEW CHECKLIST

Development Name: Bethlehem Landfill Northern Realignment
Municipality: Lower Saucon Township
Date: October 1, 2020

Watershed: Saucon Creek
Reviewer: Elena Tucci
Checked by: Geoffrey Reese, PE

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			

302.A,B. Applicable Storm Water Management Provisions

Subarea(s)	188	189	196	
Criteria	30%/50% RR	100% RR	100% RR	

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

Ordinance Reference	Item	Consistency w/Ordinance Yes	No	N/A	Comment
303.A.	Design consistency with applicable management provisions from 302.A. and B		X		See letter for details.
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		See letter for details.
	Check rational method detention volume vs. TR55			X	
C.	Minimum detention pond freeboard specifications		X		See letter for details.
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			

BETHLEHEM LANDFILL COMPANY

Northern Realignment

LAND DEVELOPMENT PLAN SUPPORTING DOCUMENTATION

Volume 1 of 2

August 2020
Revised October 29, 2020

Prepared by:
Martin and Martin, Incorporated
37 South Main Street, Suite A
Chambersburg, PA 17201
Phone: 717.264.6759
Fax: 717.264.7339
Website: martinandmartininc.com

Bethlehem Landfill Company (BLC)
Northern Realignment

LAND DEVELOPMENT PLAN SUPPORTING DOCUMENTATION

August 2020
Revised 10/29/2020

TABLE OF CONTENTS

SECTION 2
Project Narrative
Revised 10/29/2020 – Added Special Exceptions Narrative

BETHLEHEM LANDFILL COMPANY
NORTHERN REALIGNMENT
LAND DEVELOPMENT PLAN SUPPORTING DOCUMENTATION

PROJECT NARRATIVE

GENERAL OPERATING CONCEPTS

Background

The Bethlehem Landfill (Permit No. 100020) is located in Lower Saucon Township, Northampton County, Pennsylvania, off of Applebutter Road. In 1993, 2001, and 2016 the landfill received Special Exception approval from the Lower Saucon Township Zoning Hearing Board to utilize 206 acres of the property (all within the existing PaDEP Permit Boundary) for landfill use. The Northern Realignment proposes development of new waste disposal area within this 206 acres. The realignment area of development is within an area previously approved for the "original landfill" and landfill support activities. The Northern Realignment proposes 29 acres of new lined landfill expansion having a total disturbance of 48.9 acres. All of the disturbed acreage is within the referenced permit boundary and all but 5.3 acres has been previously disturbed or approved for earth disturbance for landfill or landfill support activities. The landfill presently accepts municipal, construction/demolition, DEP approved residual and sewage sludge waste. The waste streams anticipated for the proposed facility will be similar to those currently accepted.

Daily Operations

No operational changes at the Bethlehem Landfill are proposed with the Northern Realignment including but not limited to hours of operation, equipment utilized onsite, method of disposal, and procedures for emergencies.

In addition to no operational changes, no change in the number or classification of employees is proposed. The current number and Job Classification of employees are as follows:

1 - District Manager
1 - Compliance Manager
2 - Office Staff/Scale House
1 - Operations Manager
5 - Operators
1 - Mechanic

Laborers are hired as needed.

LINER SYSTEMS

The liner system for the virgin (outside old waste areas) northern area, approximately 3.75 acres, will be identical to the facility's currently permitted liner system. The liner system that is atop old waste will be a "piggyback" system including geogrid reinforcement in addition to all of the

components of the other liner system. The liner systems are designed and will be constructed and operated to prevent the migration of leachate through the liner. The liner system is designed to be resistant to physical failure and to be chemically compatible with the anticipated waste stream and resultant leachate through the use of high density polyethylene (HDPE) geomembrane.

Each element of the liner system will be designed and constructed to meet or exceed the performance standards and requirements of Section 273.251 of the current DEP municipal waste rules and regulations.

LANDFILL CAPACITY, LIFE EXPECTANCY AND SEQUENCE OF DISPOSAL OPERATIONS

The sequence of operation will be to fill atop existing Southeastern Realignment Cells and original Landfill using a temporary berm; to construct and fill Cells N-1, N-2 and N-3, and to construct the remainder of Cell 4-E approved under the Southeastern Realignment modification. The size of each new cell, its capacity, longevity, and fill volumes are shown on the following table.

BETHLEHEM LANDFILL – NORTHERN REALIGNMENT

Cell #	Area Cell (Acres)	Capacity [1]		Longevity (yrs) [3]
		CY	Tons [2]	
Cell N-1	10.4	848,700	500,733	1.17
Cell N-2	7.7	593,000	349,870	0.82
Cell N-3	10.6	840,000	495,600	1.16
TOTAL	**28.7**	**2,281,700**	**1,346,203**	**3.15**

(1) Capacity is net of liner system and final cover
(2) Assumes VCF = 0.59
(3) 1,375 Tons/day – 312 days/year

BETHLEHEM LANDFILL COMPANY NORTHERN REALIGNMENT
SPECIAL EXCEPTION CHECKLIST
SITE PLAN & NARRATIVE

§180-102.C (2) The site plan shall include, as a minimum, all the following information, except that these requirements may be modified by the Planning Commission to reflect the information needed to review adequately the plans for the intended use:

(a) Location of the site, drawn to a scale of not less than one inch equals 50 feet, showing abutting streets, nearest cross streets, driveways on adjacent lots, structures on adjacent lots which are less than 100 feet from the property line, dimensions and size of the site.

Refer to Attachment 1, Preliminary/Final Northern Realignment Land Development Plan & Site Plan, *Dated August 10, 2020*, Plan Sheets 2 & 4.

(b) Streets and property lines, curbs, pavements sidewalks, easements and rights-of-way.

Refer to Attachment 1, Preliminary/Final Northern Realignment Land Development Plan & Site Plan, *Dated August 10, 2020*, Plan Sheets 2 thru 7.

(c) Location and dimensions of all existing and proposed buildings, structures, walls, fences, utility buildings, existing major trees and other existing significant landscape elements.

Refer to Attachment 1, Preliminary/Final Northern Realignment Land Development Plan & Site Plan, *Dated August 10, 2020*, Plan Sheets 2 thru 7.

(d) Existing and proposed contours, at maximum two-foot intervals, and limit of earth disturbance. Where slopes exceed 20%, ten-foot contour intervals are acceptable. Contours shall be accurately shown and based upon field survey and/or aerial photography. All contours shall be based on USGS datum.

Refer to Attachment 1, Preliminary/Final Northern Realignment Land Development Plan & Site Plan, *Dated August 10, 2020*, Plan Sheets 5 & 11.

(e) Location of all existing watercourses, wetlands, drainageways, floodplain limits and rock outcroppings, cliffs, quarries and woodlands. Also, the location of any carbonate geology features that might pertain to the site.

Refer to Attachment 1, Preliminary/Final Northern Realignment Land Development Plan & Site Plan, *Dated August 10, 2020*, Plan Sheets 8 & 9 and Attachment 5, "Carbonate Geology."

(f) Zoning data for all proposed buildings, structures or uses, including height, number of floors, building total floor area, yards, lot coverage, number of parking spaces, number of dwelling units, total building area and proposed uses. Also, zoning calculations of slope, woodland cover, floodplain, wetlands, riparian corridors, rock outcrop, cliff and quarry areas, and Watershed Protection Areas with associated calculations of required adjusted setbacks, lot size, and development density or cover requirements.

Refer to Attachment 1, Preliminary/Final Northern Realignment Land Development Plan & Site Plan, *Dated August 10, 2020*, Plan Sheets 8, 9 & 10, and Attachment 6, "Environmental Protection Analysis."

(g) The title of the development, date, revision dates, North arrow, scale, name and address of owner, name and address of equitable owner (if applicable) and name and address of applicant, if different from owner or equitable owner, and signature of the applicant and the owner, with a statement indicating their approval of the plan.

Refer to Attachment 1, Preliminary/Final Northern Realignment Land Development Plan & Site Plan, *Dated August 10, 2020*, Cover Sheet and All Plan Sheets.

(h) Location and dimensions and proposed surfacing of existing and proposed off-street parking and loading spaces, traffic access, circulation drives and pedestrian walks and projected volumes of vehicle and pedestrian traffic using the site.

Refer to Attachment 1, Preliminary/Final Northern Realignment Land Development Plan & Site Plan, *Dated August 10, 2020*, Plan Sheet 10, and Attachment 7, "Traffic Impact Analysis."

(i) Location, size and type of proposed landscaping and buffer planting and the designation of those areas of natural vegetation not to be disturbed.

Refer to Attachment 1, Preliminary/Final Northern Realignment Land Development Plan & Site Plan, *Dated August 10, 2020*, Plan Sheets 10, 12 & 17.

(j) Location, type, design, shielding and hours of operation of all existing and proposed exterior, parking lot and garage lighting.

Refer to Attachment 1, Preliminary/Final Northern Realignment Land Development Plan & Site Plan, *Dated August 10, 2020*, Plan Sheet 10, and Attachment 8, "Neighborhood Protection Analysis." No new lights are proposed with this application. Existing safety and security lighting is present at the office/scale house area. In the winter months, temporary lighting is routinely used on the working face of the landfill during operational hours between 6:00 a.m. and 6:00 p.m.

(k) Description and elevation view of all proposed structures.

No new structures are proposed with this application. Line of sight plans depicting the proposed modified landfill are included within Attachment #17.

(l) Location, type, size, design, color and illumination of all signs.

No new signage is proposed with this application.

(m) Location and description of water supply, fire protection system, sewage facilities and storm water management facilities and supporting calculations.

No new water supply, fire protection or sewage facilities are proposed with this application. Permanent Post Construction Stormwater Management details can be found in Attachment 10, "Post-Construction Storm Water Management Plans and Report."

(n) Location of building or structure listed in or eligible for the National Register of Historic Sites, and estimated date of construction of all existing buildings and structures.

Refer to Attachment 1, Preliminary/Final Northern Realignment Land Development Plan & Site Plan, *Dated August 10, 2020*, Plan Sheet 4.

(o) A project narrative providing the following information:

[1] Proposed use.

Continuation of the Municipal Waste Landfill use with additional disposal capacity for the existing Bethlehem Landfill. Refer to Attachment 1, Preliminary/Final Northern Realignment Land Development Plan & Site Plan, *Dated*

***August 10, 2020*, Cover Sheet, and Attachment 11, "Land Development Plan Project Narrative."**

[2] Hours of use.

Waste Receiving Hours: Monday-Saturday from 7:00 a.m.–4:00 p.m.; Site Operating Hours: Monday-Saturday from 6:00 a.m.-6:00 p.m.

[3] Description of product produced, services provided or goods sold and process or methods used in providing these services.

Refer to Attachment 11, "Land Development Plan Project Narrative."

[4] Number and job classification of employees.

There will be no additional employees as a result of this application.

[5] A plan for providing emergency services, including police, health and fire.

Refer to Attachment 12, "Preparedness, Prevention & Contingency Plan."

[6] A list of chemicals to be used or stored on the property in any quantity in excess of 20 cubic feet in volume, except:

[a] Chemicals, such as heating oil or propane, which may be required for the normal heating and cooling of a building and fire-suppression chemicals.

[b] Printing supplies, photographic developing chemicals and janitorial chemicals and lawn and agricultural fertilizers in a quantity not to exceed 40 cubic feet.

[c] Above ground tanks for storage of fuel oil for use by the property owner for:

[i] Farm-related equipment;
[ii] Trucks or automobiles; and/or
[iii] Emergency equipment or vehicles.

Refer to Attachment 1, Preliminary/Final Northern Realignment Land Development Plan & Site Plan, *Dated*

***August 10, 2020*, Plan Sheet 15, and Attachment 8, "Neighborhood Protection Analysis."**

[7] A list of all toxic or hazardous substances, as described in §180-96G, to be used or stored on the property.

Refer to Attachment 1, Preliminary/Final Northern Realignment Land Development Plan & Site Plan, *Dated August 10, 2020*, Plan Sheet 15, and Attachment 8, "Neighborhood Protection Analysis."

(p) Certification that utilities to be provided are adequate for the intended use.

No new utilities or additional utility demands are proposed as a result of this application. See Attachment 11, "Land Development Plan Project Narrative."

(q) The copy of all required permits and supporting documents required by federal, state and local government agencies.

Refer to Attachment 13, Pennsylvania Solid Waste Permit No. 100020, re-issued September 8, 2017, as subsequently amended. The Northern Realignment requires a Major Modification of referenced permit which application shall be made in the next several months. Copies of all applications made to PaDEP or other Federal, State and Local agencies shall be provided to the Township at the time of filing.

(r) In the case of on-lot sewage disposal, the locations and elevations of all passing and failing soil test trenches and percolation tests and proposed primary and replacement drain field areas and all soil test results.

On-lot sewage disposal facilities are not applicable to this project.

(s) Location, type and design of proposed soil erosion and sedimentation control devices with appropriate narrative, and approval from the Soil and Water Conservation District of said plan.

Refer to Attachment 9, "PADEP Major Permit Modification for the Northern Realignment – Form I," and Attachment 14, "Erosion and Sedimentation Control Plans." Related approvals for this project will be issued by PaDEP rather than the Conservation District. Said approval shall be made part of the Major Permit Modification to the existing Solid Waste Permit.

(t) A traffic impact study for all proposed land uses expecting to generate 250 trips per day of traffic. (Ingress is one trip and egress is one trip.)

Refer to Attachment 7, "Traffic Impact Analysis."

§180-109.F. Additional requirements applying to extraction and processing of natural resources, landfills and waste disposal facilities and waste transfer and recycling facilities. [Amended 5-19-1999 by Ord. No. 99-6]

(1) Additional site plan requirements. Plans and data supporting the zoning permit application shall be prepared and submitted, which includes the following:

(a) A project narrative shall be expanded to include:

[1] The owner of the facility and contact person for the development and operation phases of the facility.

Bethlehem Landfill Company
2335 Applebutter Road
Bethlehem, PA 18015
610-317-3200 Mr. David Panucci

[2] Material to be extracted or disposed of and the method of extraction, processing and/or disposal.

Refer to Attachment 11, "Land Development Plan Project Narrative."

[3] The type of machinery to be used during the facilities' development and operation and their noise levels.

Refer to Attachment 1, Preliminary/Final Northern Realignment Land Development Plan & Site Plan, *Dated August 10, 2020*, Plan Sheet 15, and Attachment 8, "Neighborhood Protection Analysis."

[4] The estimated length of economic life of the facility.

Refer to Attachment 11, "Land Development Plan Project Narrative."

[5] The location and proximity to the processing and storage facility.

All facilities related to this application are located onsite.

[6] An explanation of the permitting process and status with other agencies, state and federal.

Refer to Attachment 13, Pennsylvania Solid Waste Permit No. 100020, re-issued September 8, 2017, as subsequently amended. The Northern Realignment requires Major Modification to said permit. Application to PaDEP for modification shall be made in the next several months. In addition to the Solid Waste Permit Modification, modification to the Bethlehem Landfill's Industrial NPDES Permit is required as well as a determination of compliance from the Lehigh Valley Planning Commission with regard to the Act 167 Stormwater Management Ordinance will be sought. Copies of all applications shall be provided to the Township at the time of filing.

[7] The wind direction, by percentage of time, and effects it may have on site development, operations and surrounding neighborhoods.

Refer to Attachment 1, Preliminary/Final Northern Realignment Land Development Plan & Site Plan, *Dated August 10, 2020*, Plan Sheet 15, and Attachment 8, "Neighborhood Protection Analysis."

[8] An explanation of need and timing of explosives, if any.

Refer to Attachment 1, Preliminary/Final Northern Realignment Land Development Plan & Site Plan, *Dated August 10, 2020*, Plan Sheet 15, and Attachment 8, "Neighborhood Protection Analysis."

[9] The hours of operation.

Waste Receiving Hours: Monday-Saturday from 7:00 a.m.–4:00 p.m.; Site Operating Hours: Monday-Saturday from 6:00 a.m.-6:00 p.m.

[10] Procedures for emergencies, hazards and accidents.

Refer to Attachment 12, "Preparedness, Prevention & Contingency Plan."

[11] The ultimate use and ownership of the site after completion of extraction or disposal.

Refer to Attachment 15, "Landfill Closure Plan."

[12] The existing ground cover and restoration ground cover.

Refer to Attachment 15, Landfill Closure Plan."

(b) The site plan shall show the following additional items pertaining to the development and operation of the site:

[1] Final grading by contours, in two-foot intervals.

Refer to Attachment 1, Preliminary/Final Northern Realignment Land Development Plan & Site Plan, *Dated August 10, 2020*, Plan Sheets 11, 12 & 13.

[2] The interior road system proposed for the site, including ingress and egress points, and their relation to local and state roads and railroad crossings.

Refer to Attachment 1, Preliminary/Final Northern Realignment Land Development Plan & Site Plan, *Dated August 10, 2020*, Plan Sheet 10.

[3] Sources of water, water needed for development and operation of the site or facility, the effect on the groundwater table and methods of disposing of drainage and excess water accumulated during the course of operation.

The proposed project will have no effect on current daily water usage. The project proposed no modifications to existing water services. There will be no increased water demand.

[4] Treatments for mitigating noise, dust, glare and vibration.

Refer to Attachment 1, Preliminary/Final Northern Realignment Land Development Plan & Site Plan, *Dated August 10, 2020*, Plan Sheet 15, and Attachment 8, "Neighborhood Protection Analysis."

[5] Landscaping, buffering, embankment height, method of drainage and erosion control.

Refer to Attachment 1, Preliminary/Final Northern Realignment Land Development Plan & Site Plan, *Dated August 10, 2020*, Plan Sheet 17; Attachment 9, "PADEP Major Permit Modification for the Northern Realignment – Form I;" Attachment 10, "Post-Construction Storm Water Management Plans;" and Attachment 14, "Erosion and Sedimentation Control Plans."

[6] A copy of all Department of Environmental Protection and other applicable agencies' permit information, including but not limited to applications, review comments, terms and conditions of permits.

Refer to Attachment 13, Pennsylvania Solid Waste Permit No. 100020, re-issued September 8, 2017, as subsequently amended. The Northern Realignment requires a Major Modification of referenced permit which application shall be made in the next several months. Copies of all applications made to PaDEP or other Federal, State and Local agencies shall be provided to the Township at the time of filing.

[7] Fencing proposed.

Refer to Attachment 1, Preliminary/Final Northern Realignment Land Development Plan & Site Plan, *Dated August 10, 2020*, Plan Sheet 4. No new fencing is proposed. All fencing is existing and surrounds the perimeter of the permitted disposal area.

[8] Proposals for ground water monitoring testing and environmental protection.

Refer to Attachment 16, "PADEP Major Permit Modification for the Northern Realignment – Form 7."

Surrounding Property Notifications
Revised October 29, 2020

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

Andrew I. & Jennifer C. Nuss
2447 Applebutter Road
Hellertown, PA 18055

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M^{c}Dowell, P.E.

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

April F. Meyers
2565 Ringhoffer Road
Hellertown, PA 18055

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M^{c}Dowell, P.E.

martin and martin, incorporated

37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

Bethlehem City
10 East Church Street
Bethlehem, PA 18018

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M°Dowell, P.E.

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

Bethlehem Commerce Center LLC
13191 Crossroads Parkway N. 6th Floor
City of Industry, CA 91746-3497

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M^{c}Dowell, P.E.

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

Bruce R. & Ginger L. Petrie
2626 Redington Road
Hellertown, PA 18055-3334

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M^{c}Dowell, P.E.

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

Bushkill Valley Motorcycle Club
1312 Tatamy Road
Easton, PA 18042

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M^{c}Dowell, P.E.

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

Carl A. and Carol A. Ziegler
4049 Sherry Hill Road
Hellertown, PA 18055

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M^{c}Dowell, P.E.

martin and martin, incorporated

37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

Carlos Gonzalez
C/O David J. Gonzalez
1181 E. 4th St.
Bethlehem, PA 18015

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the

Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M^{c}Dowell, P.E.

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

Carmella Pheiff & Jody E. Hijazi
2189 Kistler Avenue
Bethlehem, PA 18015-4709

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M^{c}Dowell, P.E.

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

Charles F. Adams III & Adams & Walters
519 Paxinosa Road East
Easton, pA 18040

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M°Dowell, P.E.

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

Conectiv Bethlehem, LLC
C/O Calpine Bethlehem LLC Property Tax
717 Texas Ave., Ste 1000
Houston, TX 77002

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the

Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M°Dowell, P.E.

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

David G. Horvath
2549 Ringhoffer Road
Hellertown, PA 18055

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M°Dowell, P.E.

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

Dennis M. & Christine E. Hahn
2396 Riverside Drive
Bethlehem, PA 18015-1353

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M^{c}Dowell, P.E.

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

Drakos & Christine Klados
1009 Blair Road
Bethlehem, PA 18017-0498

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M^{c}Dowell, P.E.

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

Fernando & Maria L. Santana
435 E. Emmaus Ave.
Allentown, PA 18103-5915

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M°Dowell, P.E.

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

George & Eleanor Steckel
4275 Jefferson Avenue
Bethlehem, PA 18015

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M^{c}Dowell, P.E.

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

Greg & Jennifer Boardman
101 Spruce St.
Hellertown, PA 18055-2215

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M^{c}Dowell, P.E.

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

H. Michael & Philip V. Swint
602 Folk Street
Easton, PA 18042-6626

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M°Dowell, P.E.

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

Jay S. Pichel
2561 Applebutter Road
Hellertown, PA 18055

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M^{c}Dowell, P.E.

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

John Kelley
2228 Riverside Drive
Bethlehem, PA 18015-6241

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M°Dowell, P.E.

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

Joseph Severn et al
C/O Joseph Severn
1612 Gail Lane
Hellertown, PA 18055-3005

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the

Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M^{c}Dowell, P.E.

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

Joshua M. & Angela Malik
P.O. Box C
Hellertown, PA 18055

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M°Dowell, P.E.

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

Lee E. & Rose Marie Wagner
2529 Ringhoffer Road
Hellertown, PA 18055-3338

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M°Dowell, P.E.

martin and martin, incorporated

37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

Lehigh Valley Industrial Park Inc.
1720 Spillman Drive Suite 150
Bethlehem, PA 18015-2164

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M°Dowell, P.E.

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

Lisa M. Walters Trust
2557 Applebutter Road
Hellertown, PA 18055-3304

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M^{c}Dowell, P.E.

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

Louis J. & James R. Didomenico
2458 Applebutter Road
Hellertown, PA 18055

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M°Dowell, P.E.

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

Manufacturers Light & Heat Co
RR1
Hellertown, PA 18055

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M^{c}Dowell, P.E.

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

P P & L Co
C/O PPL Real Estates Taxes Genn 2
2 N. 9th Street
Allentown, PA 18101

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the

Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M°Dowell, P.E.

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

Patrick W. & Faith A. Hauze
4273 Madison Avenue
Bethlehem, PA 18015

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M°Dowell, P.E.

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

Pennsylvania Lines LLC
C/O Norfolk Souther Corp Tax Dept.
3 Commercial Place
Norfolk, VA 23510

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the

Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M°Dowell, P.E.

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

Peter & Linda Danubio
C/O County Tax Claim Division
669 Washington Street
Easton, PA 18042

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the

Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M^{c}Dowell, P.E.

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

Rachael A. Schrantz
2545 Ringhoffer Road
Hellertown, PA 18055-3338

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M°Dowell, P.E.

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

Ricky K. & Timothy M. Steely
2485 Applebutter Road
Hellertown, PA 18055-3302

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M^{c}Dowell, P.E.

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

Robert D. & Elizabeth A. Blasko
2510 Redington Road
Hellertown, PA 18055-3331

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M^{c}Dowell, P.E.

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

Robert G. Raidline III
2384 Applebutter Road
Bethlehem, PA 18015

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M°Dowell, P.E.

martin and martin, incorporated

37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

Ryan K. Maas & Desiree A. Reuss-Flowers
2390 Riverside Drive
Bethlehem, PA 18015-6242

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M°Dowell, P.E.

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

RZB LLC
2476 Riverside Drive
Bethlehem, PA 18015-6200

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M^{c}Dowell, P.E.

martin and martin, incorporated

37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

Salvatore & Diane Gagliano
2530 Wolf Pack Run
Hellertown, PA 18055-3359

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M^{c}Dowell, P.E.

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

Saucon Grove LLC
756 Main St. , Box 178
Tatamy, PA 18085-0178

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M^{c}Dowell, P.E.

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

Shannon A. Smith Revocable Trust et al
C/O BB&T Wealth
3200 Beechleaf Ct., Ste 900
Raleigh, NC 27604

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the

Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M°Dowell, P.E.

martin and martin, incorporated

37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

Silver Creek Investments LLC
3380 Lower Saucon Road
Hellertown, PA 18055-3015

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M°Dowell, P.E.

martin and martin, incorporated

37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

Sterling J. & Roberta J. Severn
2564 Severn Lane
Hellertown, PA 18055

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M°Dowell, P.E.

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

Thomas E. Conley Jr.
2470 Applebutter Road
Hellertown, PA 18055

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M^{c}Dowell, P.E.

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

Timothy J. & Catherine J. Fenn
4071 Sherry Hill Road
Hellertown, PA 18055-3346

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M^{c}Dowell, P.E.

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

Tina-Louise & Andrew G. Krasnansky
2430 Applebutter Road
Hellertown, PA 18055

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M^{c}Dowell, P.E.

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

Todd & Tinamarie Seifert
2495 Applebutter Road
Hellertown, PA 18055

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M^{c}Dowell, P.E.

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

UGI Bethlehem LNG LLC
1 Meridian Blvd Ste 2C01
Wyomissing, PA 19610-3230

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M^{c}Dowell, P.E.

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

Walter Jr. & Sharon Szmodis
2537 Ringhoffer Road
Hellertown, PA 18055-3338

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M°Dowell, P.E.

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

William Gallo
4044 Sherry Hill Road
Hellertown, PA 18055

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M°Dowell, P.E.

martin and martin, incorporated
37 South Main Street • Suite A • Chambersburg, Pennsylvania • 17201-2251

(717) 264-6759
(717) 264-7339 (fax)
Website: martinandmartininc.com

September 29, 2020

William J. & Susan Severn
1144 Applebutter Road
Hellertown, PA 18055

RE: Bethlehem Landfill Company
Application for Preliminary/Final Land Development Plan,
Site Plan, and Lot Consolidation
Northern Realignment
Our file: b/1162.4/NR/LDP/NL

Dear Property Owner:

This letter is written to inform you that Bethlehem Landfill Company (BLC) has filed an application for approval of a Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan for the development of a project known as the Northern Realignment at Bethlehem Landfill located at 2325 Applebutter Road (Tax ID No. 22-357-5227).

The Northern Realignment proposed by the Preliminary/Final Land Development and Site Plan includes a 29-acre, lined landfill expansion (a 25.5 acre overlay on top of existing disposal area and 3.75 acres of new disposal footprint), a Mechanically Stabilized Earthen ("MSE") Berm on portions of the northern and eastern boundaries of the landfill property, and some modifications to the landfill's stormwater management system.

The plan proposes to consolidate the existing landfill parcel—Tax ID No. 22-357-5227, 423 acres—("Existing Landfill Parcel") with two parcels to the north N8/14/10719E 61.4 acres and N8/14/201719E 140.3 acres. The Northern Realignment project will be located ONLY on the Existing Landfill Parcel—NO improvements or landfill activities are being proposed on the two

lots that are being consolidated with the Existing Landfill Parcel as part of the Northern Realignment project.

You are receiving notice of this application because you own property that either: 1) adjoins TAX PARCEL NOS: 1) P7/5/33-0719, N8/14/10719E & N8/14/201719E or 2) adjoins property that directly adjoins those parcels. Such notice is required by Section 145-33.E(12) of the Township's Subdivision and Land Development Ordinance.

Copies of the proposed Preliminary/Final Land Development Plan, Site Plan, and Lot Consolidation Plan are available for inspection at the Lower Saucon Township Municipal Building. The telephone number of Lower Saucon Township is (610) 865-3291. You may also contact David Panucci, a representative of BLC, at (610) 317-3200, to answer any questions you may have concerning the land development.

Very truly yours,
MARTIN AND MARTIN, INCORPORATED

Joseph M. M°Dowell, P.E.

SECTION 16
Aerial Mapping
Revised 10/29/2020

KEY

- BETHLEHEM CONSOLIDATED PROPERTIES
- ADJOINING PROPERTIES
- PERMIT BOUNDARY
- LIMIT OF CONSTRUCTED LINER
- LIMIT OF CONSTRUCTED CAP (EAST OF LIMIT)

AERIAL PHOTOGRAPH DATE : 02-03-2020

400' 0' 400' 800'

PREPARED BY:

martin and martin incorporated
37 south main street suite A
chambersburg, pennsylvania . 17201

Bethlehem Landfill Company

WASTE CONNECTIONS INC.
Connect with the Future®

NORTHERN REALIGNMENT

POST - CONSTRUCTION STORMWATER MANAGEMENT PLAN

Bethlehem Landfill Company

STORMWATER MANAGEMENT FACILITY MAINTENANCE NOTES

STORMWATER FACILITY OWNERSHIP

UPON COMPLETION OF THE PROJECT, THE OWNER WILL BE RESPONSIBLE FOR PERFORMING ANY PERIODIC OR ONGOING MAINTENANCE OF PERMANENT STORMWATER MANAGEMENT FACILITIES.

PERFORMANCE REQUIREMENTS

IF FOR ANY REASON THE DESIGNED FACILITIES OR CONTROL MEASURES DO NOT PERFORM AS REQUIRED, THE CONTRACTOR AND/OR OWNER SHALL ADJUST AND/OR MODIFY THE STORMWATER FACILITIES TO MEET THE APPLICABLE PERFORMANCE STANDARDS. MODIFICATIONS TO PERMANENT STORMWATER FACILITIES SHALL BE SUBJECT TO APPROVAL BY THE TOWNSHIP. MATERIALS AND DETAILS SPECIFIED SHALL NOT BE ALTERED DURING CONSTRUCTION WITHOUT WRITTEN APPROVAL BY LOWER SAUCON TOWNSHIP COUNCIL.

MAINTENANCE REQUIREMENTS

STORMWATER BASINS: INSPECTION AND MAINTENANCE OF STORMWATER BASINS SHALL OCCUR QUARTERLY, AFTER EVERY MAJOR STORM EVENT, OR MORE OFTEN IF PROBLEMS ARE PRESENT. FACILITY BERMS SHALL BE INSPECTED FOR ANY SIGNS OF EROSION AND/OR NON-VEGETATED AREAS, POTENTIAL AREAS OF WEAKNESS, ANIMAL BURROWS, AND TAMPERING. ANY AREAS OF THE BERM FOUND TO BE INADEQUATE SHALL BE REPAIRED TO ORIGINAL DESIGN SPECIFICATIONS IMMEDIATELY. FACILITY BOTTOMS SHALL BE KEPT FREE OF UNDESIRABLE VEGETATION, SEDIMENT, AND DEBRIS, AND SHALL BE KEPT IN A CLEAN CONDITION. ANY INVASIVE OR NOXIOUS PLANTS SHALL BE PURGED ENTIRELY UPON DETECTION. FACILITY INTERIORS SHALL BE KEPT FREE OF DEBRIS, INCLUDING LITTER, LEAVES, STICKS, GRASS CLIPPINGS AND SEDIMENT. IF SEDIMENT IS REMOVED FROM THE FACILITY IT SHALL BE TAKEN TO A PERMITTED SITE WITH AN APPROVED EROSION CONTROL PLAN. DBASIN OUTLET STRUCTURES SHALL BE KEPT FREE OF OBSTRUCTIONS AND DEBRIS INCLUDING LITTER, LEAVES, STICKS, GRASS CLIPPINGS, DEAD OR LIVE ANIMALS AND SEDIMENT.

STORMWATER PIPING AND CULVERTS: INSPECTION AND MAINTENANCE OF STORMWATER PIPING AND CULVERTS SHALL OCCUR QUARTERLY, AFTER EVERY MAJOR STORM EVENT, OR MORE OFTEN IF PROBLEMS ARE PRESENT. STORMWATER PIPING AND CULVERTS SHALL BE KEPT FREE OF OBSTRUCTIONS AND DEBRIS INCLUDING LITTER, LEAVES, STICKS, GRASS CLIPPINGS, DEAD OR LIVE ANIMALS AND SEDIMENT. ANY RIPRAP APRONS AT PIPE OUTLETS SHALL BE INSPECTED TO ENSURE THAT PROPER EROSION PROTECTION IS IN PLACE. ANY EROSION MUST BE REPAIRED AND WASHED-OUT RIPRAP MUST BE REPLACED TO ORIGINAL DESIGN SPECIFICATIONS. SHOULD RIPRAP WASHOUT OR EROSION OCCUR REGULARLY, THE SITE ENGINEER SHOULD BE CONTACTED TO DETERMINE IF MORE DURABLE OUTLET PROTECTION IS NEEDED, AND TO DESIGN A MORE DURABLE OUTLET PROTECTION AS NEEDED.

STORMWATER INLETS: INSPECTION AND MAINTENANCE OF STORMWATER INLETS SHALL OCCUR QUARTERLY, AFTER EVERY MAJOR STORM EVENT, OR MORE OFTEN IF PROBLEMS ARE PRESENT. STORMWATER INLETS SHALL BE KEPT FREE OF OBSTRUCTIONS AND DEBRIS INCLUDING LITTER, LEAVES, STICKS, GRASS CLIPPINGS, DEAD OR LIVE ANIMALS AND SEDIMENT.

GRASS-LINED CHANNELS AND SWALES : INSPECTION AND MAINTENANCE OF SWALES SHALL OCCUR QUARTERLY, AFTER EVERY MAJOR STORM EVENT, OR MORE OFTEN IF PROBLEMS ARE PRESENT. CHANNELS AND SWALES SHALL BE MOWED REGULARLY AS NEEDED AND SHALL BE KEPT FREE OF OBSTRUCTIONS AND DEBRIS INCLUDING LITTER, LEAVES, STICKS, GRASS CLIPPINGS, DEAD OR LIVE ANIMALS AND SEDIMENT. CHANNELS SHALL BE MAINTAINED TO THE DESIGN CAPACITY AND DIMENSIONS INDICATED ON THESE PLANS.

PERMANENTLY SEEDED AREAS (NON STORMWATER): INSPECTION AND MAINTENANCE OF PERMANENTLY SEEDED AREAS SHALL OCCUR SEMI-ANNUALLY, AFTER EVERY MAJOR STORM EVENT, OR MORE OFTEN IF PROBLEMS ARE PRESENT. AREAS WITH PERMANENT SEEDING MEASURES SHALL BE INSPECTED FOR SIGNS OF EROSION AND/OR AREAS WHERE VEGETATION HAS FAILED AS WELL AS ANY INVASIVE OR NOXIOUS PLANTS. ALL BARE SPOTS SHALL BE RE-SEEDED AND INVASIVE OR NOXIOUS PLANTS SHALL BE PURGED ENTIRELY.

ROCK LINED CHANNELS AND SWALES: INSPECTION AND MAINTENANCE OF ROCK LINED SWALES SHALL OCCUR QUARTERLY, AFTER EVERY MAJOR STORM EVENT, OR MORE OFTEN IF PROBLEMS ARE PRESENT. CHANNELS AND SWALES SHALL BE INSPECTED FOR ROCK STABILITY, SEDIMENT ACCUMULATION AND SCOUR HOLES THROUGHOUT THE LENGTH OF THE CHANNEL. REPAIR CHANNELS BY REPLACING ANY DISPLACED STONES AND REMOVE DEBRIS INCLUDING SEDIMENT. REPAIR ERODED AREAS WITH ROCK RIPRAP AS NEEDED.

DEFINITIONS

MAJOR STORM EVENT: A MAJOR STORM EVENT OR SIGNIFICANT STORM EVENT SHALL BE DEFINED AS A RAINFALL EVENT GREATER THAN 2-INCHES IN MAGNITUDE.

LEHIGH VALLEY PLANNING COMMISSION REVIEW

Reviewed by the Leigh Valley Planning Commission

_____ _____

DATE PLANNER

TOWNSHIP PLANNING COMMISSION RECOMENDATIONS

Recommended for approval by the Lower Saucon Township Planning Commission this

_____day of _____20____.

_____ _____

CHAIRMAN SECRETARY

TOWNSHIP COUNCIL APPROVAL AND TOWNSHIP ENGINEER REVIEW

Approved by the Lower Saucon Township Council this

_____day of _____20____.

_____ _____

SECRETARY COUNCIL PRESIDENT

Reviewed by:

TOWNSHIP ENGINEER

This _____ day of _____20____. .

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL JOSEPH MICHAEL MAXWELL ENGINEER NO.057039E

PENNSYLVANIA ONE CALL SYSTEM, INC. 1-800-242-1776 DIGSAFELL BEFORE YOU DIG!

LOCATION OF EXISTING UNDERGROUND UTILITIES ARE BASED UPON SURFACE EVIDENCE AND EXISTING DRAWINGS AND ARE NOT GUARANTEED TO BE COMPLETE OR ACCURATE BY BYERS & RUNYON SURVEYING, CONTRACTOR SHOULD CONTACT THE P.A. ONE CALL SYSTEM AT (1-800-242-1776) PRIOR TO ANY EXCAVATION AS REQUIRED BY PA. ACT 38 (1991)

BETHLEHEM LANDFILL COMPANY BEING THE OWNER / EQUITABLE OWNER OF THE LANDS PROPOSED FOR SUBDIVISION LAND DEVELOPMENT PROVIDED HEREIN ACKNOWLEDGE THE STORMWATER MANAGEMENT SYSTEM TO BE A PERMANENT FIXTURE THAT CAN BE ALTERED OR REMOVED ONLY AFTER APPROVAL OF A REVISED PLAN BY LOWER SAUCON TOWNSHIP.

_____ _____

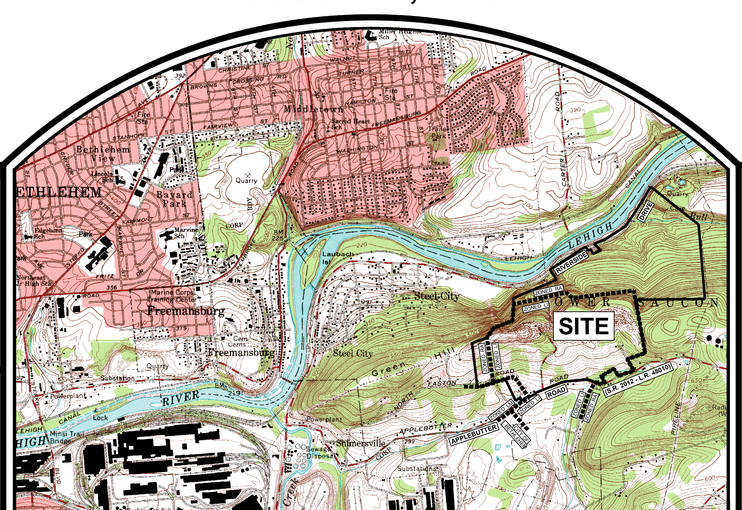
OWNER / TITLE DATE

AUGUST 10, 2020

LOWER SAUCON TWP.

REV. OCTOBER 29, 2020

NORTHAMPTON COUNTY



LOCATION MAP | N | **SCALE: 1" = 2,000'**

OWNER / APPLICANT

BETHLEHEM LANDFILL COMPANY
2335 APPLEBUTTER ROAD
BETHLEHEM, PA 18015

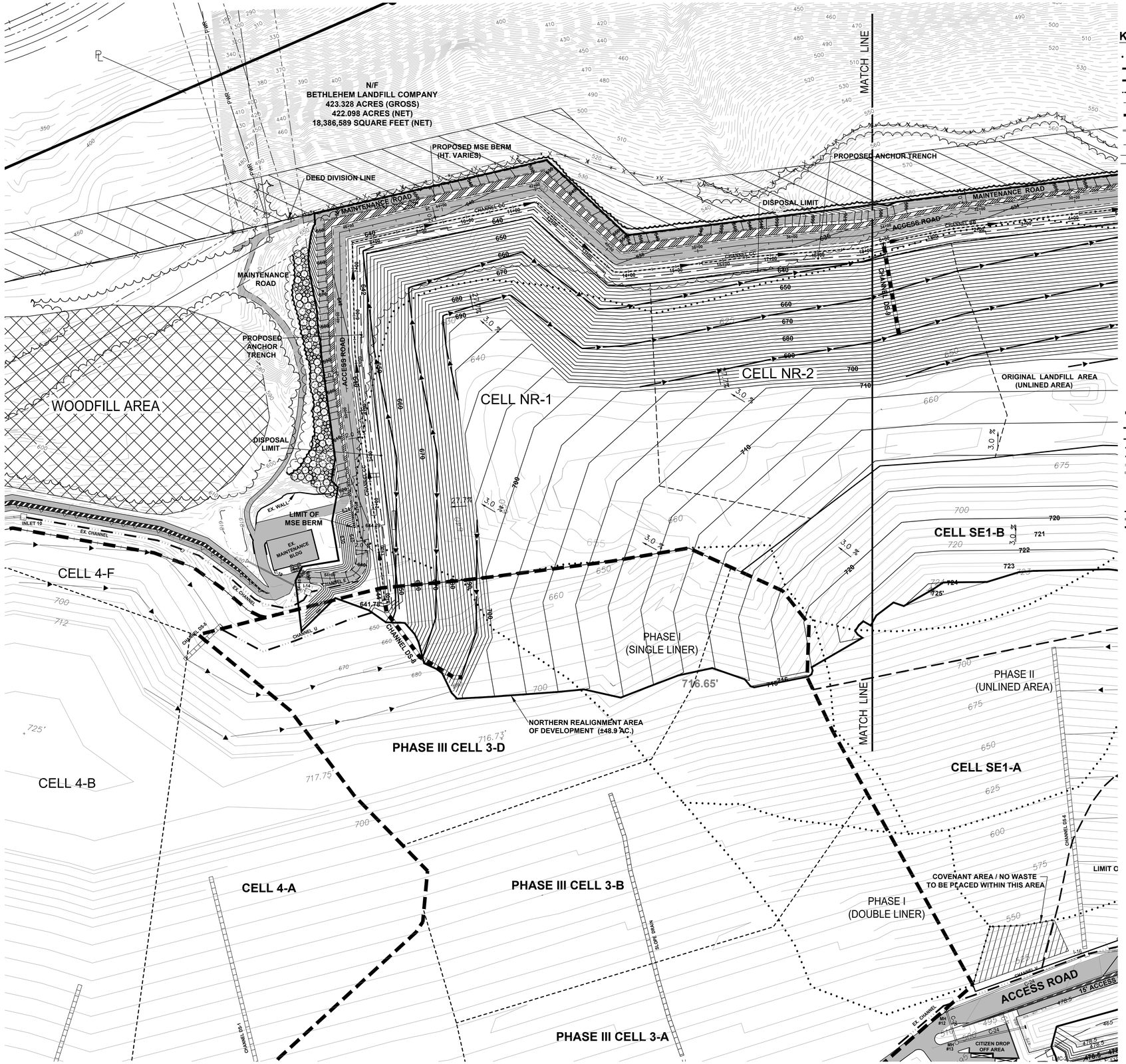
Bethlehem Landfill Company

PREPARED BY:

martin and martin, Inc.
37 South Main Street • Suite A
Chambersburg, Pennsylvania 17201
phone: (717) 264-6759

TABLE OF CONTENTS

FILE: 1162.4 (NORTHERN EXPANSION) 1162.4-PC-01.dwg



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(423.328 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.)
- EX. OR PREVIOUSLY APPROVED CONTOURS
- PROPOSED CONTOURS
- OVERHEAD UTILITY POLE
- FENCE
- WETLAND AREAS
- RIPARIAN CORRIDOR BUFFER
- STREAM PROTECTION EASEMENT
- WOOD LINES, TREE MASSES
- LANDFILL WOODLAND EASEMENT
- WOODFILL AREA
- NORTHERN REALIGNMENT – MSE BERM
- ACCESS ROAD – NORTHERN REALIGNMENT ACCESS ROAD
- MAINTENANCE ROAD – NORTHERN REALIGNMENT MAINTENANCE ROAD
- NORTHERN REALIGNMENT AREA OF DEVELOPMENT
- NORTHERN REALIGNMENT – CELL DIVISION
- NORTHERN 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

COMMONWEALTH OF PENNSYLVANIA — JOSEPH M. HALL JR. — PROFESSIONAL ENGINEER — REGISTERED

NO.	REVISION	DATE
1	AS PER 09/17/20 HANOVER REV. LETTER	10/29/20

POST -CONSTRUCTION STORMWATER MANAGEMENT PLAN (1"=100')

NORTHAMPTON CO.

LOWER SAUCON TWP.

PRELIMINARY / FINAL LAND DEVELOPMENT PLAN & SITE PLAN

Bethlehem Landfill Company

PENNSYLVANIA

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

PROJ. NO.	DWN. BY:	SCALE:
1162.4	DB	100' 50' 0 100' 200'
DSN. BY:	CHK. BY:	Scale: 1" = 100'
JM	RWB	

CADD FILE: 1162.4–PC–2,3.dwg

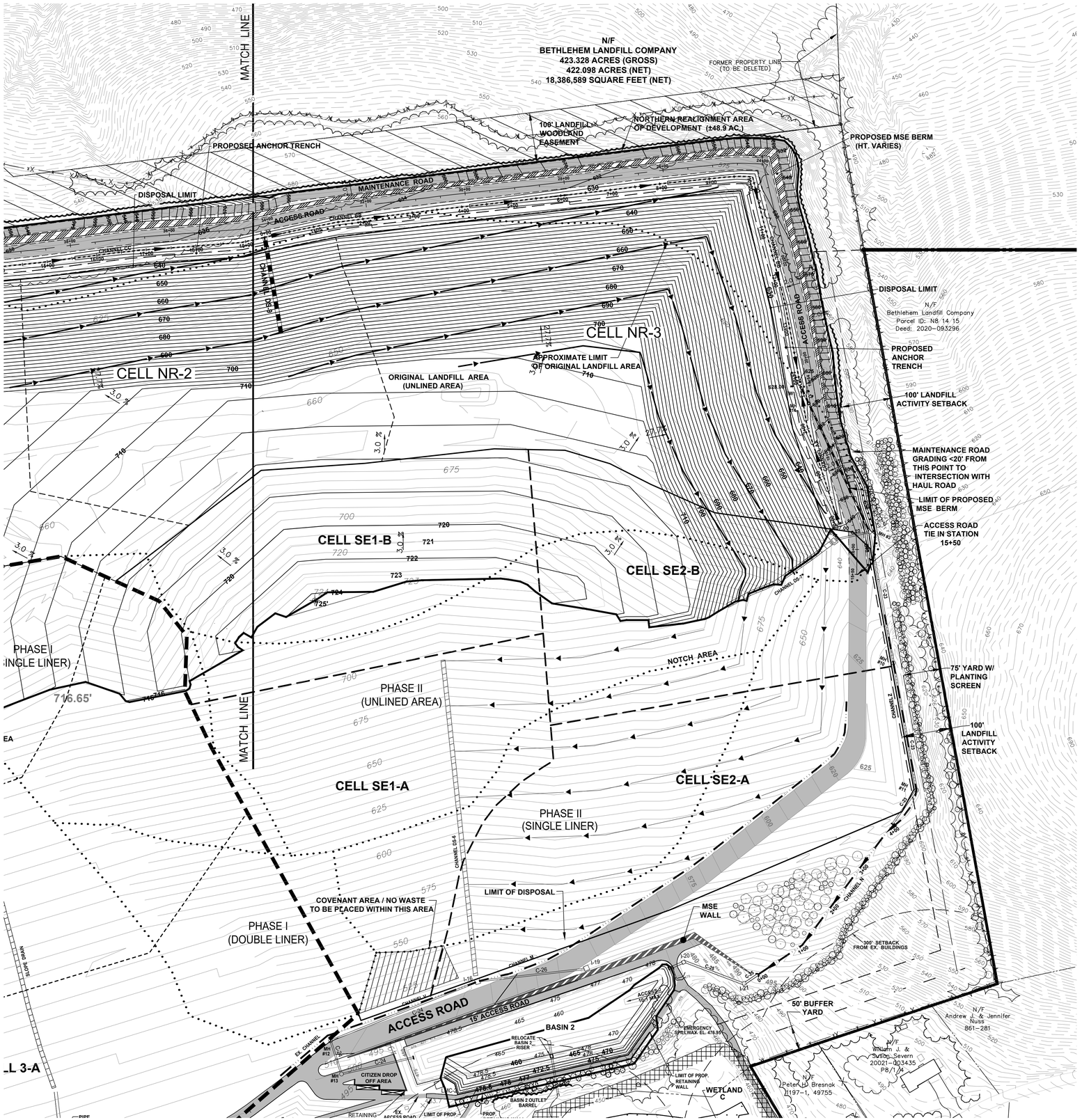
DATE: 08/10/20

SCALE: 1" = 100'

DRAWING NO.

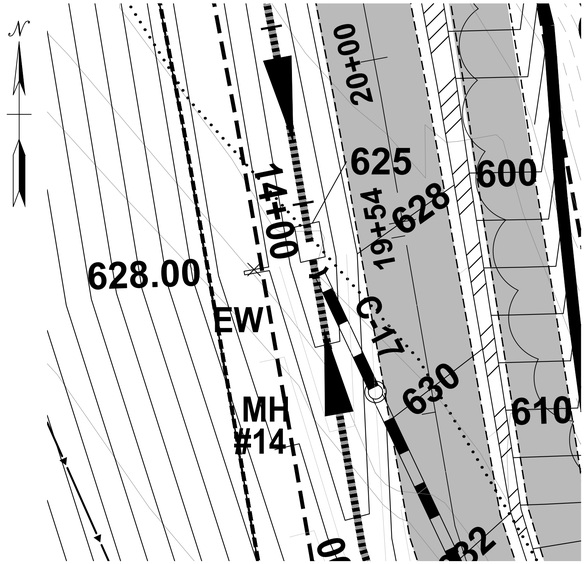
PC - 2

FILE: 1162.4 (NORTHERN EXPANSION) 1162.4–PC–02,3.dwg



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(423.328 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.)
- EX. OR PREVIOUSLY APPROVED CONTOURS
- PROPOSED CONTOURS
- OVERHEAD UTILITY POLE
- FENCE
- WETLAND AREAS
- RIPARIAN CORRIDOR BUFFER
- STREAM PROTECTION EASEMENT
- WOOD LINES, TREE MASSES
- LANDFILL WOODLAND EASEMENT
- WOODFILL AREA
- NORTHERN REALIGNMENT – MSE BERM
- ACCESS ROAD – NORTHERN REALIGNMENT ACCESS ROAD
- MAINTENANCE ROAD – NORTHERN REALIGNMENT MAINTENANCE ROAD
- NORTHERN REALIGNMENT AREA OF DEVELOPMENT
- NORTHERN REALIGNMENT – CELL DIVISION
- NORTHERN 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



ENDWALL DRAINAGE CHANNEL DETAIL
SCALE: 1"=20'

COMMONWEALTH OF PENNSYLVANIA
JOSEPH A. MARTIN
PROFESSIONAL ENGINEER
No. 063299
REGISTERED

NO.	REVISION	DATE
1	AS PER 09/17/20 HANOVER REV. LETTER	10/29/20

POST -CONSTRUCTION STORMWATER MANAGEMENT PLAN (1"=100')

PRELIMINARY / FINAL LAND DEVELOPMENT PLAN & SITE PLAN

Bethlehem Landfill Company

LOWER SAUCON TWP. NORTHAMPTON CO. PENNSYLVANIA

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

PROJ. NO.	DWN. BY:	CHK. BY:	DSN. BY:
1162.4	DB	RMB	JM

SCALE: 100' 50' 0 100' 200' Scale: 1" = 100'

CADD FILE: 1162.4-PC-2,3.dwg

DATE: 08/10/20

SCALE: 1" = 100'

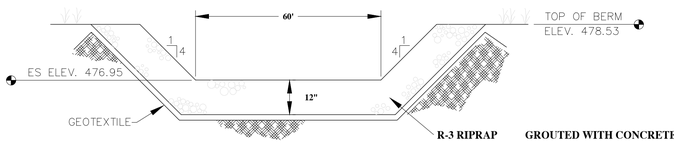
DRAWING NO. **PC - 3**

FILE: 1162.4 (NORTHERN EXPANSION) 1162.4-PC-02,3.dwg

KEY / LEGEND

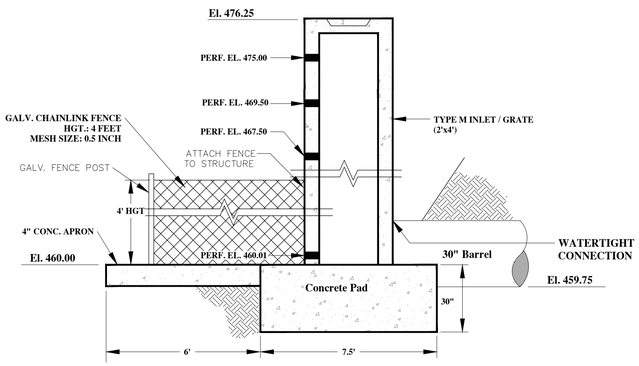
- DEP PERMIT BOUNDARY AS TAKEN FROM MARCH 1994 PERMIT DRAWINGS
- PP&L POWER LINE
- POWER LINE R/W
- BUILDING RESTRICTION LINE (B.R.L.)
- 460 - EX. OR PREVIOUSLY APPROVED CONTOURS
- FENCE
- WETLAND AREAS
- RIPARIAN CORRIDOR BUFFER
- STREAM PROTECTION EASEMENT
- WOOD LINES, TREE MASSES

- SOUTHEASTERN REALIGNMENT - MSE BERM
- ACCESS ROAD - SOUTHEASTERN REALIGNMENT - ACCESS ROAD
- SOUTHEASTERN REALIGNMENT - AREA OF DEVELOPMENT
- SOUTHEASTERN REALIGNMENT - CELL DIVISION
- SOUTHEASTERN REALIGNMENT - LIMIT OF DISPOSAL
- CHANNEL C (EXISTING OR PREVIOUSLY APPROVED)
- CHANNEL C (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)
- RETAINING WALL (PROPOSED)



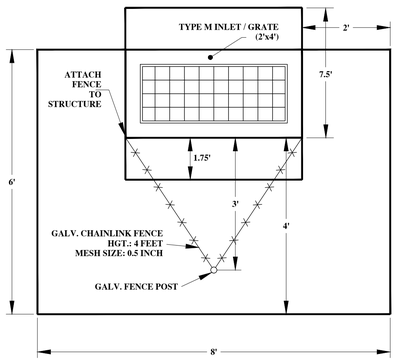
BASIN NO. 2 EMERGENCY SPILLWAY

Not to Scale



BASIN NO. 2 OUTLET STRUCTURE

Not to Scale



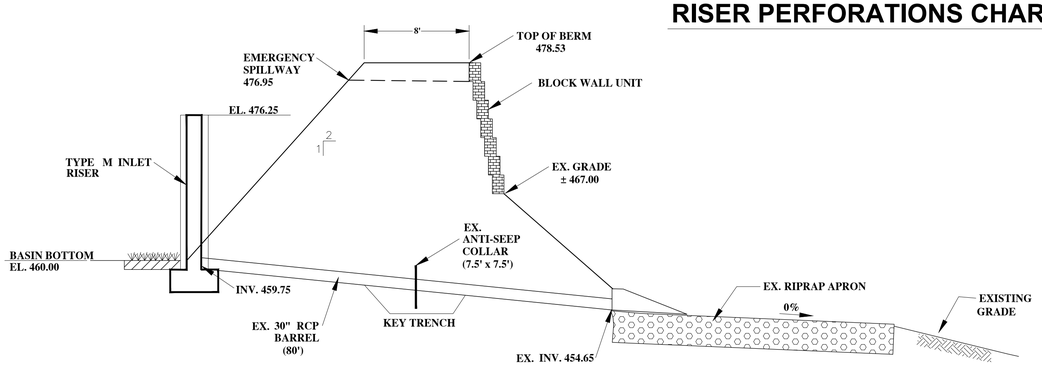
PLAN VIEW CONC. APRON

Not to Scale

ELEVATION	# HOLES	HOLE DIAMETER (IN.)
460.01	1	2.0
467.50	1	2.0
469.50	1	4.0
475.00	1	18.0

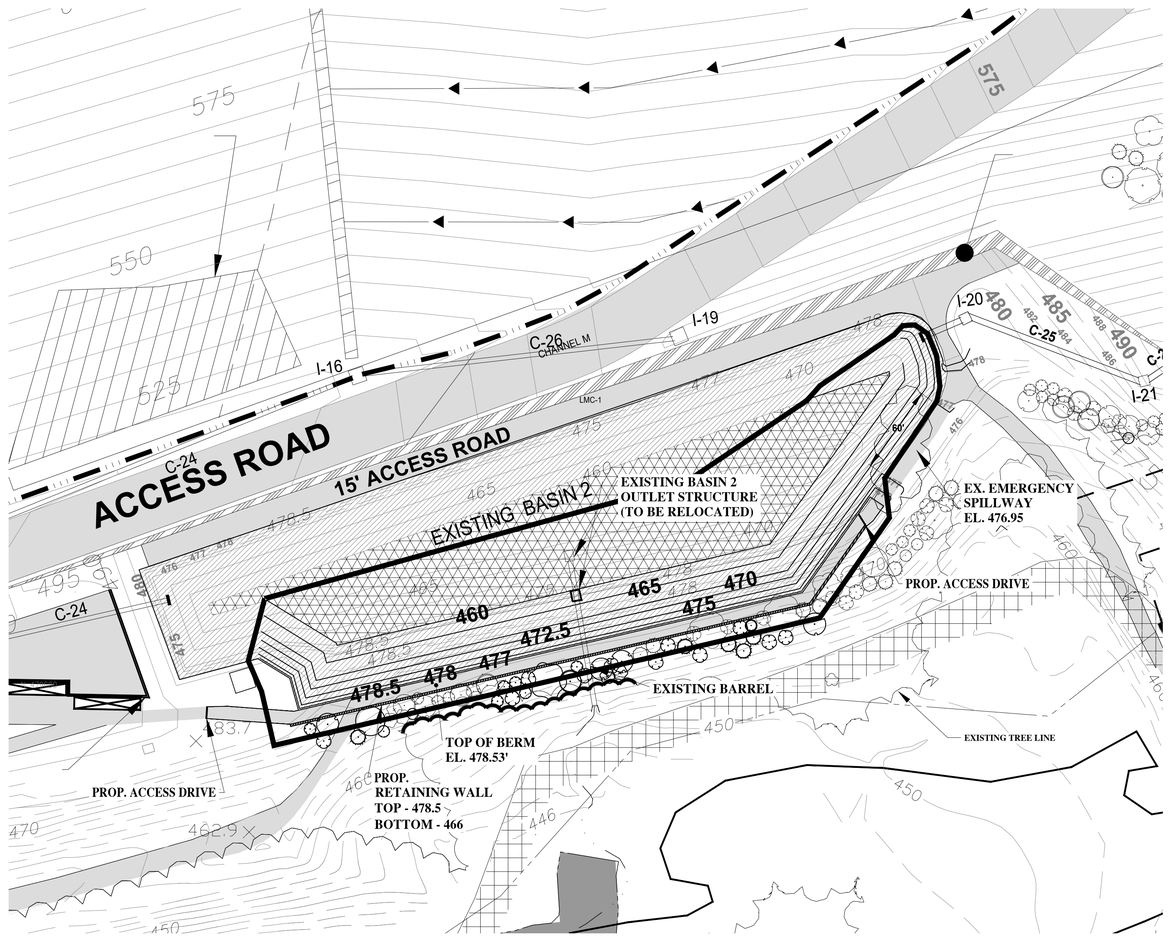
BASIN NO. 2

RISER PERFORATIONS CHART



BASIN NO. 2 OUTLET PROFILE

Not to Scale



PERMANENT DETENTION BASIN NO.2 PLAN VIEW

SCALE: 1" = 50'

IMPROVEMENTS TO BASIN 2 SHALL BE COMPLETED AT FINAL CLOSURE.

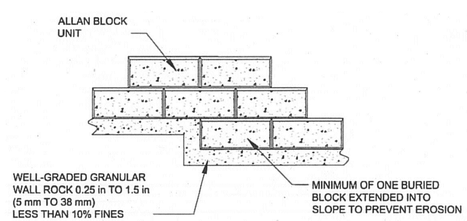
PROPOSED BASIN LANDSCAPING

- AREA TO BE REVEGETATED WITH RETENTION BASIN FLOOR SEED MIX. * .63 AC.
- PENNDOT FORMULA D SEED MIX. 1.01 AC.

* RETENTION BASIN FLOOR SEED MIX AS MANUFACTURED BY ERNST CONSERVATION SEEDS, CONTAINS A MIXTURE OF WET TOLLERANT NATIVE SEEDS INCLUDING BUT NOT LIMITED TO VIRGINIA WILDRYE, ALKALIGRASS, DEER TONGUE, FOX SEDGE, AND CREEPING BENTGRASS.

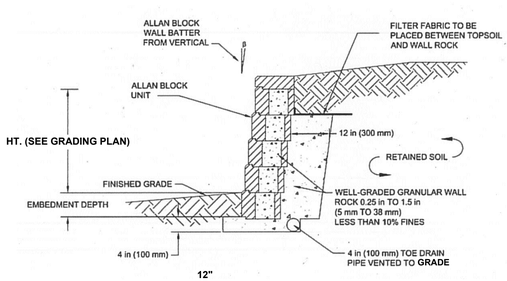
Elevation-Capacity Table

Basin #2 Elevation	Area (ac)	Capacity (ac-ft)
460	0.6	0.000
465	0.9	3.209
470	1.1	7.939
472.5	1.3	10.969
475	1.4	14.174
477	1.5	17.074
478	1.6	18.624
478.5	1.65	19.436
478.53 Top Of Berm	1.66	19.667



STEP UP AT BASE

N.T.S.



TYPICAL GRAVITY WALL SECTION

N.T.S.

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER JOSEPH MICHAEL MARTIN

NO.	REVISION	DATE
1	AS PER 09/17/20 HANOVER REV. LETTER	10/29/20

STORMWATER DETENTION BASIN 2 SECTIONS AND DETAILS

LOWER SAUCON TWP. NORTHAMPTON CO.

PRELIMINARY / FINAL LAND DEVELOPMENT PLAN & SITE PLAN

Bethlehem Landfill Company

PENNSYLVANIA

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

DWN. BY: MSH/DB | CHK. BY: RMB | PROJ. NO. 1162.4 | DSN. BY: JM

0' 50' 100'

CADD FILE: 1162.4-PC-04.dwg

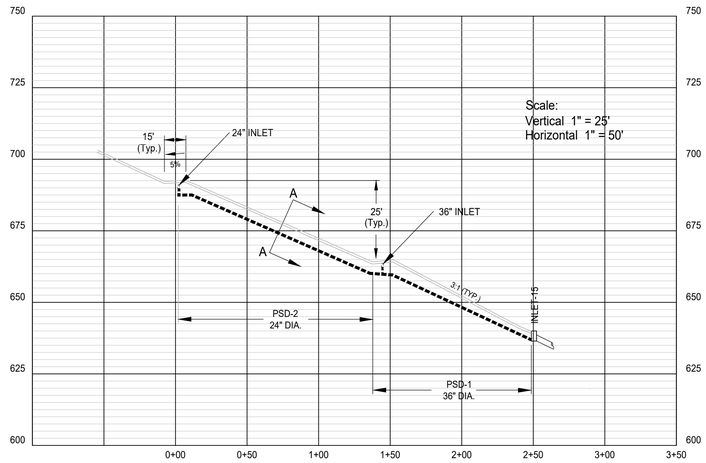
DATE: 08/10/20

SCALE: AS SHOWN

DRAWING NO.

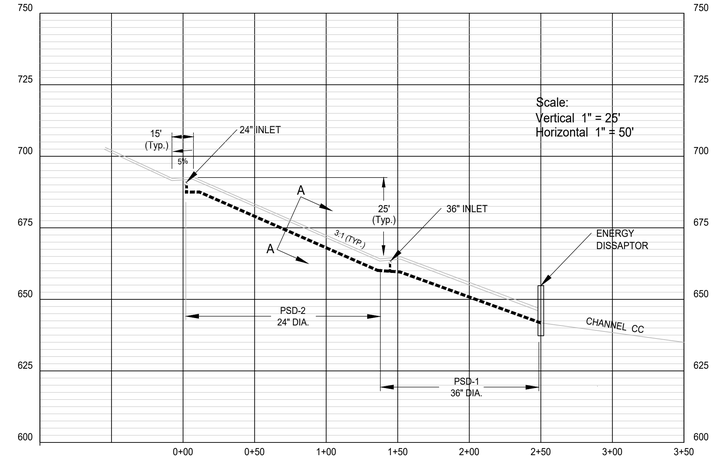
PC - 4

FILE: 1162.4 (NORTHERN EXPANSION) 1162.4-PC-04.dwg



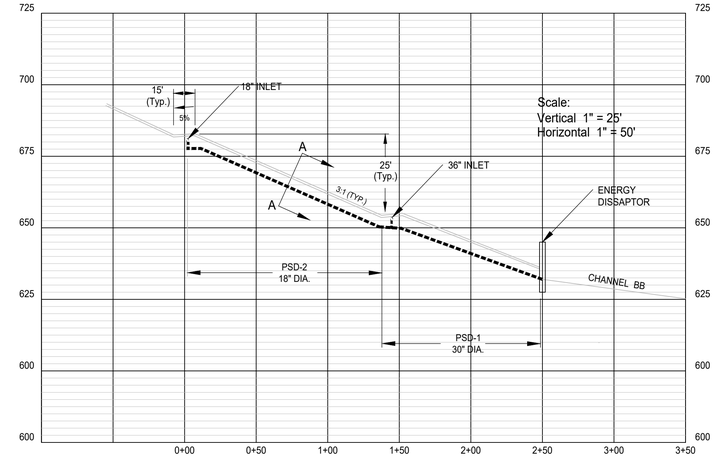
CHANNEL DS-7 PIPE SLOPE DRAIN DIAMETERS

Not to Scale



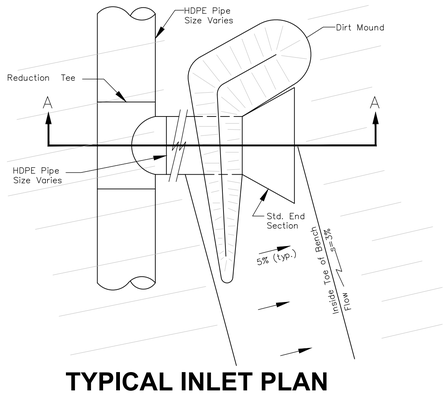
CHANNEL DS-8 PIPE SLOPE DRAIN DIAMETERS

Not to Scale



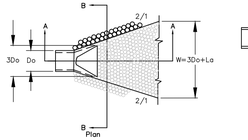
CHANNEL DS-9 PIPE SLOPE DRAIN DIAMETERS

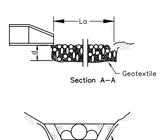
Not to Scale



TYPICAL INLET PLAN

NO SCALE





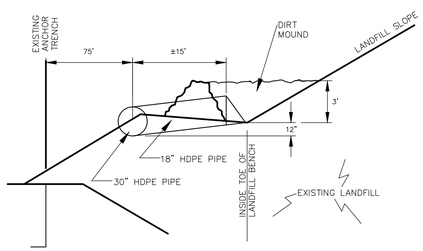
Outlet No.	Pipe Dia. Do (in)	Tailwater Condition (Max Dr Min.)	25 Yr. Q (CFS)	V (FPS)	RipRap Size	La (Ft)	W (Ft)
C–1	36	MIN.	126	8.9	R–5	22	31
C–2	24	MIN.	26	8.3	R–4	15	21
C–7	24	MIN.	16.45	3.3	R–3	5	11
C–8	15	MIN.	34.26	4.8	R–3	65	15
C–9	36	MIN.	40.0	5.3	R–4	18	27
C–10	36	MIN.	61.59	8.7	R–5	21	30
TC–1	36	MIN.	34	4.8	R–3	6	15
C–16	30	MIN.	31.0	5.5	R–4	16	*
C–18	36	MIN.	67.4	12.0	R–5	24	*
C–19	18	MIN.	10.0	5.9	R–4	10	*
C–21A	24	MIN.	23.7	7.5	R–4	14	x
C–23	54	MIN.	135.4**	8.5	R–6	28	42
C–24	36	MIN.	39.9	7.9	R–5	20	29
C–25	54	MIN.	142.3**	9.0	R–6	28	42
C–26	15	MIN.	5.15	6.5	R–3	8	x

* – WIDTH TO CONFORM TO THE DOWNSTREAM STRUCTURE
** – 100 YEAR STORM Q

ROCK OUTLET PROTECTION

NO SCALE

d= 1.5 Times The Maximum Stone Diameter But No Less Than 6 Inches



TYPICAL INLET SECTION A-A

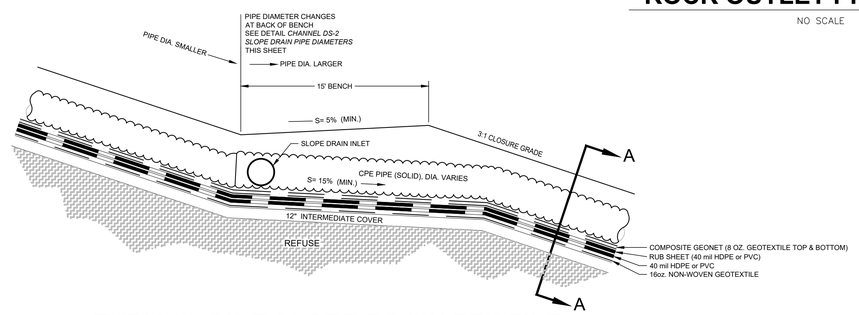
NO SCALE

SUMMARY OF CULVERT PIPES

CULVERT NO.	SIZE (IN.)	MATERIAL	LENGTH (FT.)	SLOPE (FT./FT.)	UPSTREAM INVERT (FT./MSL.)	DOWNSTREAM INVERT (FT./MSL.)	Q_{100} (CFS)	INLET STRUCTURE	OUTLET STRUCTURE	OUTLET PROTECTION	VELOCITY FLOWING FULL (FPS)
C–1	(2) 36"	CMP	39	0.023	457.00	456.10	152.6	TYPE M	TYPE D–W ENDWALL	RIPRAP	14.5
C–2	24"	CMP	13	0.109	448.6	434.48	33.9	MH #1	TYPE D ENDWALL	RIPRAP	12.9
C–3	24"	RCP	468	0.02	458.00	448.70	33.9	MH #2	MH #1	– – –	11.0
C–4	24"	CMP	250	0.145	494.35	458.10	22.7	TYPE M	MH #2	– – –	14.9
C–5	18"	CMP	30	0.110	427.00	423.70	4.5	TYPE D ENDWALL	TYPE M	– – –	9.9
C–5a	21"	RCP	215	0.005	424.80	423.70	8.70	TYPE M	TYPE M	– – –	4.6
C–6	24"	RCP	60	0.005	423.70	423.40	10.85	TYPE M	TYPE M	– – –	5.5
C–7	24"	RCP	80	0.005	423.40	423.00	13.00	TYPE M	TYPE D ENDWALL	RIPRAP	5.5
C–8	15"	RCP	82	0.18	495.00	480.00	3.8	M	TYPE D–W ENDWALL	RIPRAP	12.5
C–9	36"	RCP	60	0.05	506.00	503.00	52.9	2–M	TYPE D ENDWALL	RIPRAP	14.0
C–14	15"	HDPEP	416	0.016	654.75	648.25	4.1	TYPE M	INLET TYPE M	– – –	3.2
C–15	30"	HDPEP	396	0.01	646.93	642.97	26.9	TYPE M	INLET TYPE M	– – –	5.5
C–16	30"	HDPEP	573.2	0.01	642.87	637.14	31.0	TYPE M	TYPE D ENDWALL	RIPRAP	5.5
C–17	**48"**	**HDPEP**	**287**	**0.01**	**624.59**	**621.72**	**101.69**	**MHH14**	**MH #3**	**– – –**	**8.1**
C–17	**48"**	**HDPEP**	**36**	**0.009**	**625.00**	**624.69**	**101.69**	**TYPE D ENDWALL**	**MH #14**	**– – –**	**8.1**
C–18	36"	HDPEP	230	0.033	464.52	457.06	67.4	2–TYPE M	MH 4	– – –	10.0
C–18	36"	HDPEP	235	0.042	456.96	447.20	67.4	MH 4	TYPE D ENDWALL	RIPRAP	12.0
C–19	18"	HDPEP	138	0.02	623.92	621.17	10.03	TYPE M	TYPE D ENDWALL	RIPRAP	5.89
C–22	**24"**	**HDPEP**	**71**	**0.07**	**633.00**	**628.00**	**33.70**	**TYPE M**	**MH #3**	**– – –**	**10.73**
C–23	**54"**	**HDPEP**	**100**	**0.014**	**597.40**	**596.00**	**135.39**	**MH #11**	**TYPE D ENDWALL**	**RIPRAP**	**8.52**
C–23	**54"**	**HDPEP**	**256**	**0.015**	**601.40**	**597.50**	**135.39**	**MH #10**	**MH #11**	**– – –**	**8.52**
C–23	**54"**	**HDPEP**	**264**	**0.076**	**621.62**	**601.50**	**135.39**	**MH #3**	**MH #10**	**– – –**	**8.52**
C–24	36"	HDPEP	314	0.019	513.50	507.60	62.13	TYPE M	MH #12	– – –	6.8
C–24	36"	HDPEP	67	0.037	496.50	494.00	62.13	MH #12	MH #13	– – –	10.8
C–24	36"	HDPEP	202	0.119	493.90	470.00	62.13	MH #13	TYPE D ENDWALL	RIPRAP	7.9
C–25	**54"**	**HDPEP**	**30**	**0.025**	**471.50**	**470.75**	**142.25**	**TYPE M**	**TYPE D ENDWALL**	**RIPRAP**	**8.95**
C–25	**54"**	**HDPEP**	**124**	**0.067**	**480.00**	**471.75**	**142.25**	**TYPE M**	**TYPE M**	**– – –**	**8.95**
C–25	**54"**	**HDPEP**	**30**	**0.183**	**490.00**	**484.50**	**142.25**	**TYPE DW ENDWALL**	**TYPE M**	**– – –**	**8.95**
C–26	18"	HDPEP	216	0.092	534.50	513.60	2.85	TYPE M	TYPE M	– – –	6.5

C–23 = REVISED DATA FROM CURRENTLY APPROVED PHASE IV DISPOSAL AREA MODIFICATION

NOTES:
1. HDPE – HIGH DENSITY POLYETHYLENE PIPE, CMP – POLYMER COATED CORRUGATED METAL PIPE, RCP – REINFORCED CONCRETE PIPE
2. TYPE "D" AND "D–W" ENDWALLS SHALL BE CONSTRUCTED IN ACCORDANCE WITH PENNDOT PUBLICATION 408 SECTION 605 AND STANDARDS FOR ROADWAY CONSTRUCTION.
3. CHA – CHANNEL
4. PROVIDE INLET BOX AND TOP UNIT FOR STORM INLETS #1 AND #5 WITH OPENINGS TO ACCOMMODATE A DOUBLE GRATE.
5. TYPE "M" AND "D–M" INLET TOPS AND CATCH BASINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH PENNDOT PUBLICATION 408 SECTION 605 AND STANDARDS FOR ROADWAY CONSTRUCTION
6. PRECAST MANHOLES TO BE CONSTRUCTED IN ACCORDANCE WITH PENNDOT PUBLICATION 408 SECTION 605 AND STANDARDS FOR ROADWAY CONSTRUCTION
7. ALL CMP SHALL BE POLYMER COATED WITH HUGGER BAND JOINTS. PIPING SHALL BE SAW CUT AT THE ENDS AS NEEDED AND NOT HAMMERED OR BROKEN
8. ALL RCP SHALL BE CLASS 3 REINFORCED CONCRETE PIPE WITH O–RING JOINTS.
9. ALL ENDWALLS SHALL BE CONSTRUCTED WITH FROST PROOFING WALL EXTENDING A MIN. OF 2 FEET BELOW FINISHED GRADE .
10. ALL INLETS AND STORMWATER MANHOLES ARE REQUIRED TO CONTAIN A DISK INDICATING A PROHIBITION AGAINST POLLUTANTS.
11. ALL STORMWATER PIPING SHALL HAVE WATERTIGHT JOINTS.

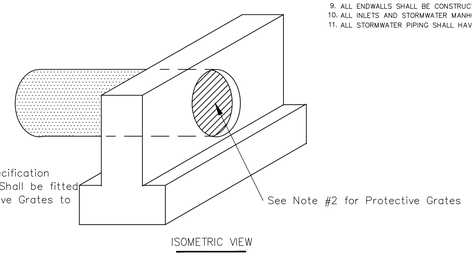


TYPICAL PIPE SLOPE DRAIN PROFILE

SCALE: NTS

PIPE "D"	"L"
21" & LESS	5'–0"
24" & 27"	7'–0"
30" & 33"	9'–0"

NOTES:
1. Meets Penn Dot RC–31 Specification
2. Upstream Endwall Opening Shall be fitted with Slanted Durable Protective Grates to prevent Unauthorized Entry.



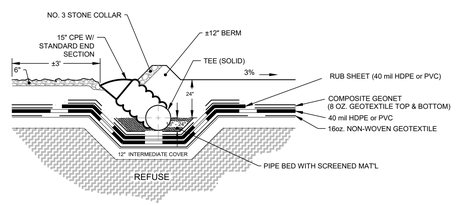
ISOMETRIC VIEW

LANDFILL INLET SCHEDULE

INLET NO.	TOP OF GRATE ELEV.	INLET ELEV. IN	INLET ELEV. OUT	INLET TYPE	PIPE. DIA.	DOWNSTREAM STRUCTURE
#1	461.10	– – –	457.00	M (3)	(2) 36"	BASIN #4
#2	499.50	– – –	495.00	M	15"	BASIN #6
#3	511.00	– – –	506.00	2–M	36"	BASIN #6
#6	428.80	– – –	424.80	M	24"	INLET #7
#7	428.80	– – –	423.70	M	24"	INLET #8
#8	428.80	– – –	423.40	M	24"	BASIN #3
#9	590.00	– – –	580.90	D–H	24"	INLET #5
#10	657.50	– – –	654.75	TYPE M	15"	#11
#11	651.00	648.25	646.93	TYPE M	30"	#12
#12	652.50	642.97	642.87	TYPE M	30"	CHANNEL C
#13	469.79	– – –	464.52	2–TYPE M	36"	CHANNEL S
#14	625.42	– – –	623.92	TYPE M	18"	SED TRAP A
#15	639.50	– – –	633.00	TYPE M	24"	MH #3
#16	521.25	513.60	513.50	TYPE M	36"	MH #13
#18	661.40	654.17	654.07	TYPE M	24"	CHANNEL Y
#19	539.75	– – –	534.50	TYPE M	18"	I–16
#20	479.00	471.75	471.50	TYPE M	48"	BASIN #2
#21	490.00	484.50	480.00	TYPE M	48"	I–20
MH #1	465.00	448.70	448.60	PRECAST MH	24"	OUTLET
MH #2	470.00	458.10	458.00	PRECAST MH	24"	MH #1
MH #3	634.00	628.00	621.62, 621.72	PRECAST MH	24"/48"	MH #12
MH #4	462.23	457.06	456.96	PRECAST MH	30"	BASIN 4
MH #5	659.50	651.69	651.62	PRECAST MH	30"	CHANNEL C
MH #6	654.50	644.97	644.93	PRECAST MH	30"	CHANNEL C
MH #7	653.44	641.98	641.94	PRECAST MH	30"	CHANNEL C
MH #8	654.02	640.31	640.27	PRECAST MH	30"	CHANNEL C
MH #9	650.94	638.22	638.18	PRECAST MH	30"	CHANNEL C
MH#10	609.25	603.50	603.40	PRECAST MH	48"	MH #11
MH#11	604.50	599.00	598.90	PRECAST MH	48"	CHANNEL N
MH#12	511.00	507.60	496.50	PRECAST MH	36"	MH#13
MH#13	513.00	494.00	493.90	PRECAST MH	36"	BASIN 2
MH#14	628.55	624.69	624.59	PRECAST MH	48"	CHANNEL N

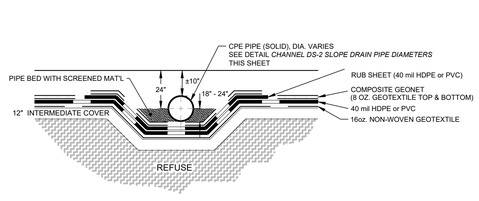
#10 = ADDED DATA FOR SOUTHEASTERN REALIGNMENT

NOTES:
1. TYPE "M" AND "D–H" INLET TOPS AND CATCH BASINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH PENNDOT PUBLICATION 408 SECTION 605 AND STANDARDS FOR ROADWAY CONSTRUCTION
2. PRECAST MANHOLES AND INLETS TO BE CONSTRUCTED IN ACCORDANCE WITH PENNDOT PUBLICATION 408 SECTION 605 AND STANDARDS FOR ROADWAY CONSTRUCTION
3. ALL STORMWATER PIPING SHALL HAVE WATERTIGHT JOINTS.
4. ALL INLETS AND STORMWATER MANHOLES ARE REQUIRED TO CONTAIN A DISK INDICATING A PROHIBITION AGAINST POLLUTANTS.



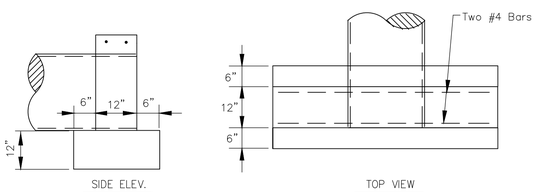
PIPE SLOPE DRAIN INLET

SCALE: NTS



SECTION A-A

SCALE: NTS



PRECAST ENDWALL TYPE "D"

NOT TO SCALE

ALTERNATE TO DOWNSLOPE DRAIN

POST CONSTRUCTION STORMWATER MANAGEMENT DETAILS

LOWER SAUCON TWP. NORTHAMPTON CO.

PRELIMINARY / FINAL LAND DEVELOPMENT PLAN & SITE PLAN

Bethlehem Landfill Company

PENNSYLVANIA

NO.	REVISION	DATE
1	AS PER 09/17/20 HANOVER REV. LETTER	10/29/20

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

DWN. BY: MSH/DB
CHK. BY: RWB
PROJ. NO. 1162.4
DSN. BY: JM

CADD FILE: 1162.4–PC–05.dwg

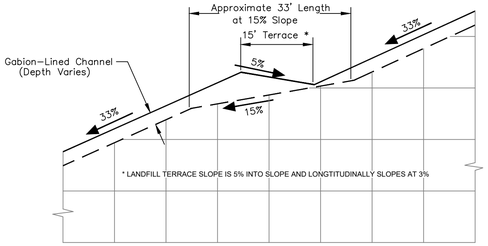
DATE: 08/10/20

SCALE: AS SHOWN

DRAWING NO.

PC - 5

FILE: 1162.4 (NORTHERN EXPANSION) 1162.4–PC–05.dwg

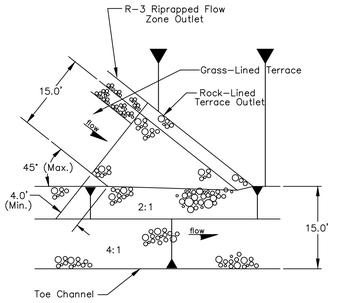


BENCH SECTION A-A

Not to Scale

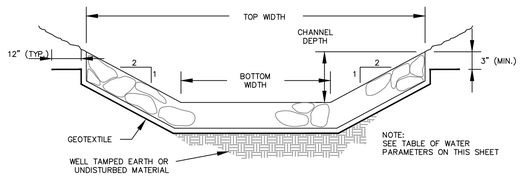
WATERWAY RIPRAP
DIMENSION TABLE

NSA NO.	d_{50}	THICKNESS
R-3	3"	9"
R-4	6"	18"
R-5	9"	27"
R-6	12"	36"
R-7	15"	45"



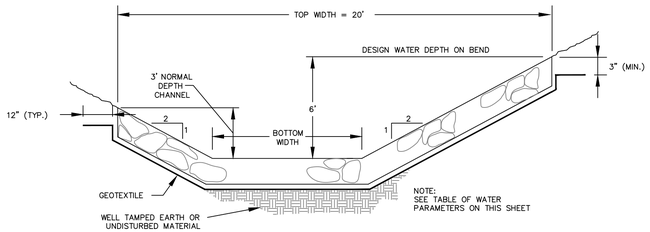
LANDFILL BENCH / CHANNEL CONNECTION

Not to Scale



TYPICAL TRAPEZOIDAL
RIPRAP CHANNEL

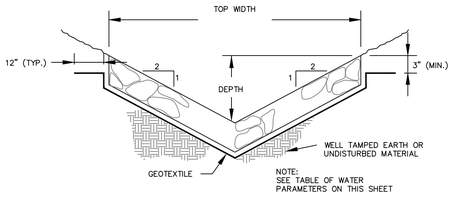
NO SCALE



CHANNEL "N" TYPICAL SECTION

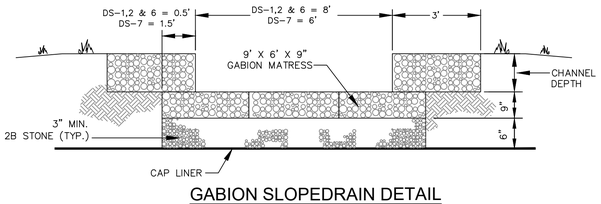
(STA. 0+75 TO 1+25) LOOKING UPSTREAM

NO SCALE



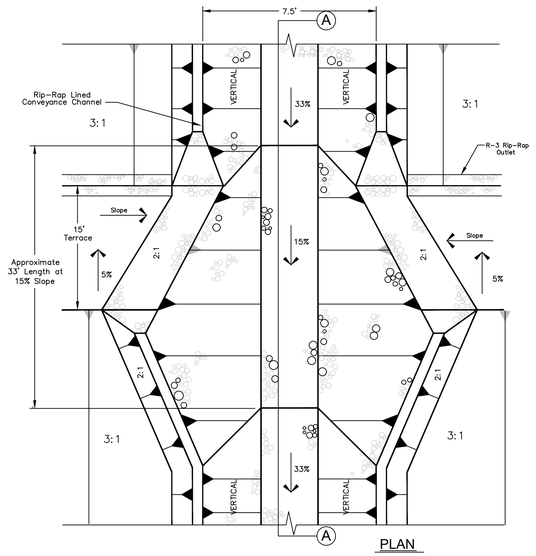
TYPICAL TRIANGULAR
RIPRAP SWALE

NO SCALE



GABION SLOPEDRAIN DETAIL

NO SCALE



DOWNSLOPE / TERRACE INTERFACE

Not to Scale

SUMMARY HYDRAULIC DESIGN OF PERMANENT / TEMPORARY WATERWAYS

CHANNEL NO.	CHANNEL STATION	AVG. SLOPE (FT./FT.)	TYPE	SIDE SLOPES (H:V)	BOTTOM WIDTH (FT)	CHANNEL DEPTH (FT)	TOP WIDTH (FT)	Q100 (CFS)	DEPTH D100 (FT)	VELOCITY V100 (FT/SEC)	MAX. ALLOWABLE VELOCITY (FT/SEC)	PROTECTIVE LINING
A (1)	0+00-8+20	0.05	TRAPE	2:1	4.0	2.0	12.0	10	0.4	5.3	6.5	R-3
A (1)	8+20-12+50	0.02	TRAPE	2:1	4.0	2.0	12.0	10	0.51	3.9	4.5	R-3
B (1)	0+00-3+00	0.05	TRAPE	2:1	4.0	2.0	12.0	3.8	0.36	2.3	4.0	GRASS
C (1)	0+00-5+50	0.20	TRAPE	2:1	6.0	2.0	13.1	52.8	0.78	9.0	11.5	R-5
C (1)	5+50-7+00	0.05	TRAPE	2:1	6.0	2.0	13.1	52.8	1.01	6.5	6.5	R-3
E (1)	0+00-4+50	0.015	TRAPE	2:1	4.0	3.0	16.00	10.3	1.81	5.7	6.5	R-3
G (1)	0+00-1+20	0.029	V	2:1	---	2.0	8.0	1.24	0.65	1.5	4.0	GRASS
H (1)	0+00-2+50	0.01	V	2:1	---	2.0	8.0	2.98	1.05	1.34	4.0	GRASS
K (1)	0+00-1+90	0.04	TRAPE	2:1	4.0	2.0	12.0	33.9	0.95	6.1	6.5	R-3
M (1)	0+00-0+63	0.040	TRI	2:1	---	3.0	9.5	15.5	2.31	4.52	6.5	R-3
M (1)	0+63-1+90	0.118	TRI	2:1	---	3.0	9.5	15.5	2.08	6.58	6.5	R-3
M (1)	1+90-2+97	0.047	TRI	2:1	---	3.0	9.5	15.5	2.31	4.52	6.5	R-3
M (1)	2+97-8+54	0.074	TRI	2:1	---	3.0	9.5	15.5	2.31	4.52	6.5	R-3
M (1)	8+54-9+64	0.023	TRI	2:1	---	3.0	9.5	15.5	2.31	4.52	6.5	R-3
N (1)	0+00-3+91	0.243	TRAPE	2:1	2.0	3.0	13.3	134.55	1.83	13.02	15.0	R-7
N (1)	3+91-4+24	0.167	TRAPE	2:1	2.0	3.0	13.3	134.55	1.79	13.43	15.0	R-7
S (1)	0+00-BASIN 4	2	TRAP	2:1	8.0	2.5	16.8	67.4	1.53	5.4	6.5	R-3
BERM SWALE (1)	ALL	ALL	TRI	3:1	0.0	1.7	10.0	3.4	.67	4.56	6.5	R-3
U	0+00-6+00	0.030	TRI	3:1	0	1.90	15.0	14	0.9	4.6	6.5	R-3
V (1)	0+00-1+25	0.008	TRI	2:1	---	2.0	8.0	1.81	0.60	2.53	6.5	R-3
V (1)	1+25-2+85	0.03	TRI	2:1	---	2.0	8.0	1.81	0.60	2.53	6.5	R-3
V (1)	2+85-3+10	0.10	TRI	2:1	---	2.0	8.0	1.81	0.60	2.53	6.5	R-3
Z (1)	0+00-0+56	0.054	TRI	2:1	- - -	2.0	7.5	3.24	0.65	3.50	6.5	R-3
Z (1)	0+56-3+16	0.015	TRI	2:1	- - -	2.0	7.5	3.24	0.76	2.78	6.5	R-3
Z (1)	3+16-4+16	0.095	TRAP	2:1	0.10	2.0	7.5	3.24	0.57	4.54	6.5	R-3
AA	**0+00-2+90**	**0.044**	**TRI**	**2:1**	**0**	**1.9**	**7.5**	**3.37**	**0.88**	**2.18**	**6.5**	**R-3**
BB	**0+00-14+11**	**0.005**	**TRAP**	**2:1**	**2.0**	**3.8**	**17.3**	**98.32**	**2.82**	**4.55**	**6.5**	**R-3**
CC	**0+00-19+40**	**0.005**	**TRAP**	**2:1**	**2.0**	**3.2**	**14.9**	**58.26**	**2.21**	**4.09**	**6.5**	**R-3**
DIV#1 (1)	0+00-3+50	4.0	V	2:1	---	3.0	12.0	12.38*	1.71*	4.34*	5.0	GRASS
DS-1A	0+00-2+83	0.26	RECT.	---	8.0	2.0	8.0	72.5*	0.9*	10.1*	14.5	GABION
DS-1*(1)	0+00-8+28	0.28	RECT.	---	8.0	2.0	8.0	72.5*	0.9*	10.1*	14.5	GABION
DS-2*(1)	0+00-6+17	0.28	RECT.	---	8.0	2.0	8.0	44.0*	0.62*	8.8*	14.5	GABION
DS-3*(1)	0+00-1+59	0.28	RECT.	- - -	6	1.5	6.0	20.4*	0.5	6.86	14.5	GABION
DS-4	---	0.42	RECT.	---	8	2.4	8.0	152.6	1.4	13.8	14.5	GABION
DS-5*	0+00-1+06	0.26	RECT.	---	6	1.5	6.0	20.4*	0.5	6.86	14.5	GABION
DS-6(1)	0+00-6+25	0.28	RECT.	- - -	8.00	2.0	8.00	43.96	0.62	8.84	14.5	GABION
DS-7(1)	0+00-2+45	0.20	RECT.	- - -	8.00	2.0	8.00	33.70	0.59	7.13	14.5	GABION
DS-8	**0+00-3+09**	**0.28**	**RECT.**	**---**	**8.0**	**2.0**	**8.0**	**44.22**	**0.62**	**8.86**	**14.5**	**GABION**
DS-9	**0+00-11+44**	**0.28**	**RECT.**	**---**	**8.0**	**2.0**	**8.0**	**26.30**	**0.48**	**6.81**	**14.5**	**GABION**

V = EXISTING CHANNEL (NO CHANGE)

E = REVISED DATA FROM CURRENTLY APPROVED PHASE IV DISPOSAL AREA MODIFICATION

DS-9 = ADDED DATA FOR NORTHERN REALIGNMENT

* CHANNEL IS NOT PART OF OVERALL CONVEYANCE SYSTEM THUS Q, DEPTH AND VELOCITY ARE BASED ON THE 25 YEAR/ 24 HOUR STORM EVENT

(1) EXISTING CHANNELS PER APPROVED PHASE IV DISPOSAL AREA MODIFICATION AND SUBSEQUENT MODIFICATIONS.
(2) APPROVED CHANNELS PER PHASE IV DISPOSAL AREA, MODIFIED FOR NORTHERN REALIGNMENT.
(3) NEW CHANNEL PROPOSED FOR NORTHERN REALIGNMENT.

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL — JOSEPH M. MARTIN — ENGINEER

NO.	REVISION	DATE
1	AS PER 9/17/20 HANOVER REV. LETTER	10/29/20

POST CONSTRUCTION STORMWATER MANAGEMENT DETAILS

LOWER SAUCON TWP. — NORTHAMPTON CO. PENNSYLVANIA

PRELIMINARY / FINAL LAND DEVELOPMENT PLAN & SITE PLAN

Bethlehem Landfill Company

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

PROJ. NO. 1162.4 | DWN. BY: MSH/DB | CHK. BY: RMB | DSN. BY: JM

SCALE: AS SHOWN

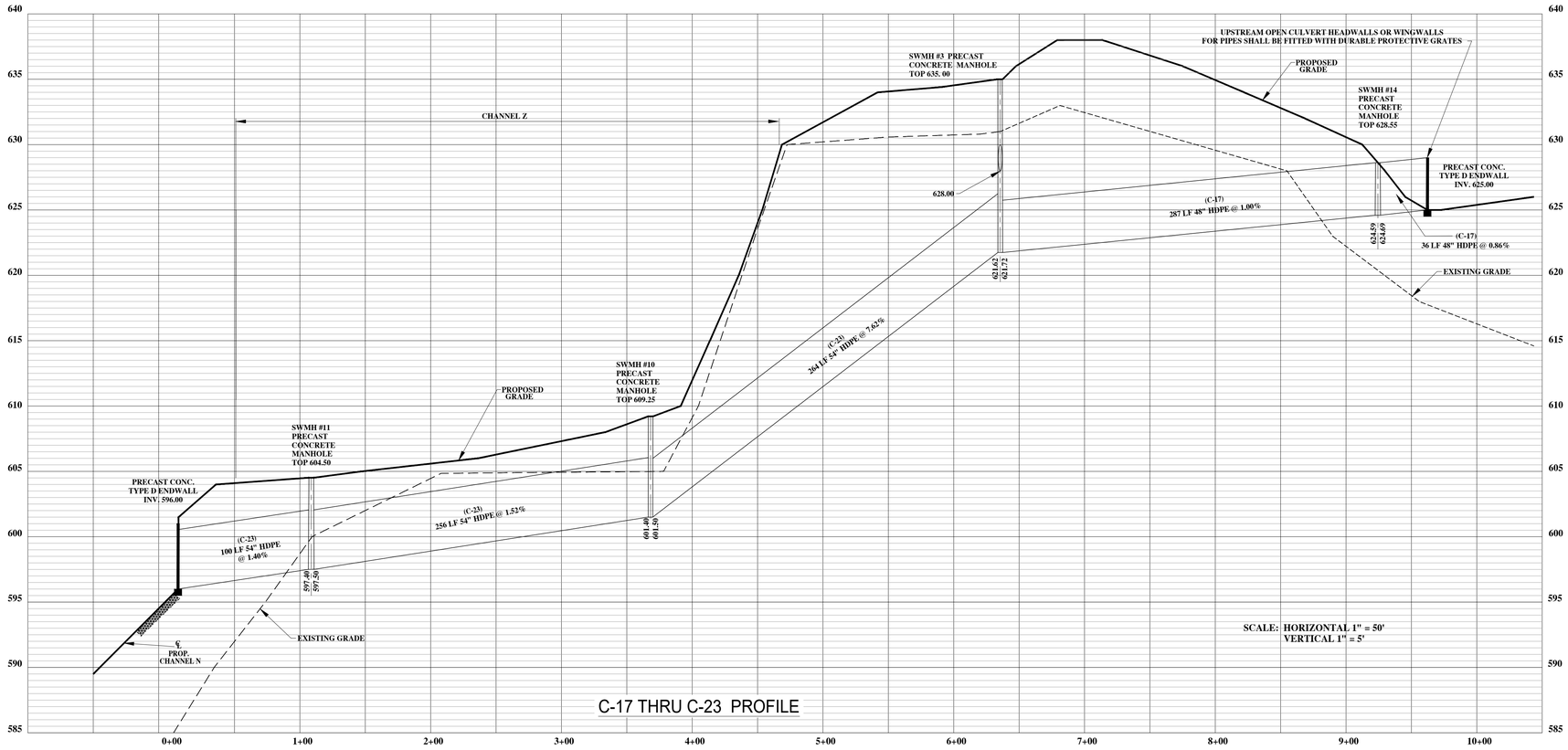
CADD FILE: 1162.4-PC-06.dwg

DATE: 08/10/20

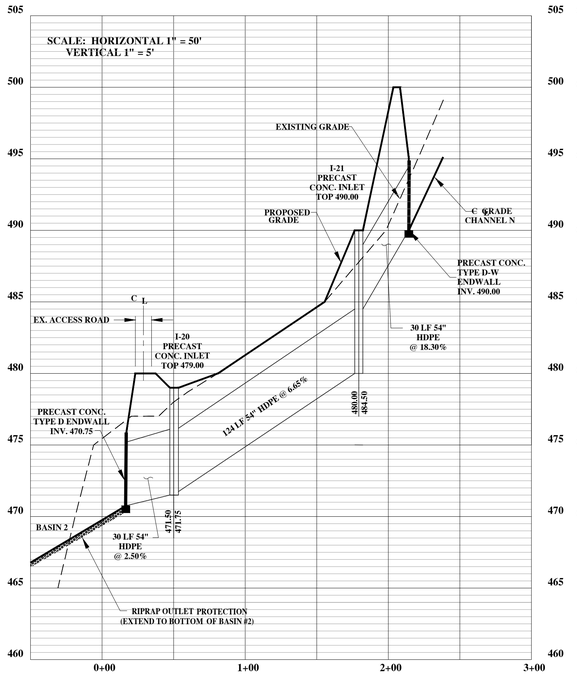
SCALE: AS SHOWN

DRAWING NO.

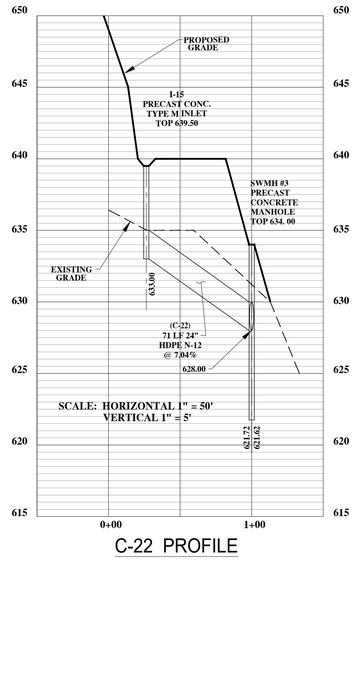
PC - 6



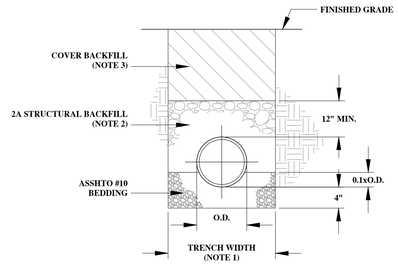
C-17 THRU C-23 PROFILE



C-25 PROFILE



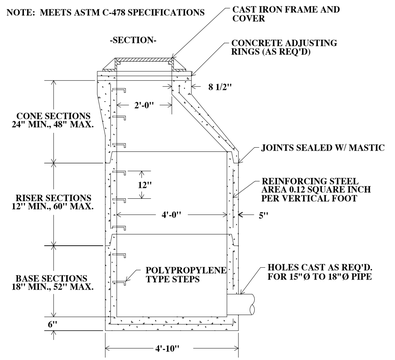
C-22 PROFILE



NOTES:
1. THE TRENCH WIDTH SHALL BE EQUAL TO THE GREATER OF (1) O.D.+16" AND (2) O.D.x1.25+12".
2. PLACE 2A BACKFILL IN 6" LIFTS COMPACTED TO 90% MAX. DENSITY.
3. WHERE PIPE IS INSTALLED BENEATH PAVED SURFACES, 2A BACKFILL SHALL BE USED FOR COVER BACKFILL. INSTALL 2A COVER BACKFILL IN COMPLIANCE WITH NOTE 2. IN NON-PAVED AREAS COVER BACKFILL SHALL BE SUITABLE EXCAVATED MATRERIAL SURFACED WITH 4" OF TOPSOIL, SEEDED AND MULCHED.
4. WHERE TRENCHES ARE EXCAVATED IN EXISTING PAVED AREAS, PAVEMENT SHALL BE FULL-DEPTH SAW CUT AT THE EDGES OF THE TRENCH. TRENCH PAVEMENT SHALL BE SEALED AT ALL SAW CUTS WITH RUBBERIZED ASPHALT SEALER MATERIAL.
5. REFER TO TYPICAL ROAD CROSS SECTION FOR PAVEMENT DESIGN.

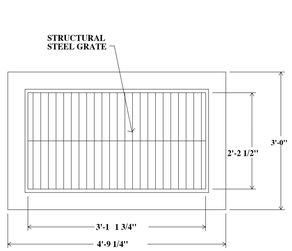
TYPICAL STORMSEWER TRENCH DETAIL

N.T.S.



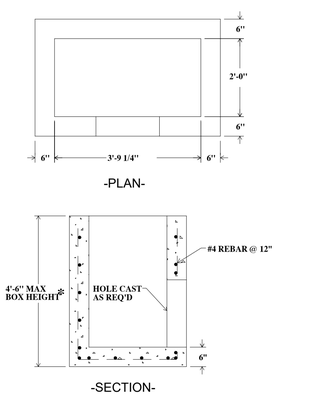
TYPICAL STORMSEWER MANHOLE

N.T.S.



PENNDOT TYPE M CONCRETE INLET TOP

N.T.S.



* RISER SECTIONS AVAILABLE FROM 2" TO 48"

PRECAST STANDARD INLET BOX 24" X 45" FOR PENNDOT INLET TOPS

N.T.S.

NO.	REVISION	DATE
1	AS PER 09/17/20 HANOVER REV. LETTER	10/29/20

POST CONSTRUCTION STORMWATER PRIOFILES

LOWER SAUCON TWP. NORTHAMPTON CO.

PRELIMINARY / FINAL LAND DEVELOPMENT PLAN & SITE PLAN

Bethlehem Landfill Company

PENNSYLVANIA

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

PROJ. NO. 1162.4 | DWN. BY: MSH/DB | CHK. BY: RMB | DSN. BY: JM

CADD FILE: 1162.4-PC-07.dwg

DATE: 08/10/20

SCALE: AS SHOWN

DRAWING NO.

PC - 7

FILE: 1162.4 (NORTHERN EXPANSION) 1162.4-PC-07.dwg

NORTHERN REALIGNMENT PRELIMINARY / FINAL
LAND DEVELOPMENT PLAN, SITE PLAN & LOT CONSOLIDATION PLAN
Bethlehem Landfill Company

PLAN PURPOSE:

THE PURPOSE OF THIS PLAN IS TO SERVE AS A PRELIMINARY / FINAL LAND DEVELOPMENT PLAN, SITE PLAN, LOT CONSOLIDATION PLAN AND SPECIAL EXCEPTION APPROVAL FOR THE NORTHERN REALIGNMENT AT THE BETHLEHEM LANDFILL. THE NORTHERN REALIGNMENT ENCOMPASSES THE FOLLOWING:

– 29 ACRES OF DISPOSAL AREA WITH 22.3 OF PREVIOUS PHASES I, II, AND ORIGINAL LANDFILL AREAS AND 3.7 ACRES OF LATERAL EXTENSION WITHIN AREAS OF PREVIOUSLY APPROVED LANDFILL SUPPORT ACTIVITIES. THE ENTIRE 29 ACRES OF DISPOSAL BEING ENTIRELY WITHIN CURRENT PADEP BETHLEHEM LANDFILL SOLID WASTE PERMIT BOUNDARY.

APPROVED WAIVERS:

BETHLEHEM LANDFILL COMPANY OBTAINED APPROVAL FROM LOWER SAUCON TOWNSHIP COUNCIL FOR THE FOLLOWING WAIVERS IN ASSOCIATION WITH THE NORTHERN REALIGNMENT PRELIMINARY / FINAL LAND DEVELOPMENT PLAN. THE WAIVERS APPROVED ARE THE MINIMUM MODIFICATIONS NECESSARY, WILL NOT BE CONTRARY TO THE PUBLIC INTEREST, AND ARE CONSISTENT WITH THE PURPOSE AND INTENT OF THE TOWNSHIP'S ORDINANCES. LITERAL ENFORCEMENT OF THE PROVISIONS FOR WHICH BLC SOUGHT WAIVERS WAS UNNECESSARY AND WOULD CAUSE UNDUE HARDSHIP ON BLC. WAIVERS IDENTICAL TO THOSE REQUESTED IN CONNECTION WITH THIS APPLICATION WERE PREVIOUSLY GRANTED BY TOWNSHIP COUNCIL IN CONNECTION WITH THE 2011 LAND DEVELOPMENT PLAN MODIFICATION FOR CELL 4F, THE 2016 LAND DEVELOPMENT APPROVAL FOR THE SOUTHEASTERN REALIGNMENT, AND OTHER PRIOR APPROVALS FOR BETHLEHEM LANDFILL. FURTHER JUSTIFICATION FOR THE REQUESTED WAIVERS IS OUTLINED WITHIN SECTION 13 OF THE LAND DEVELOPMENT PLAN SUPPORTING DOCUMENTATION BINDER WHICH IS MADE PART OF THIS PLAN.

SUBDIVISION AND LAND DEVELOPMENT ORDINANCE

1. SALDO SECTIONS 145–22.A AND 145–33.A – REGARDING PRELIMINARY PLAN APPROVAL PRIOR TO SUBMISSION OF A FINAL PLAN TO ALLOW A JOINT PRELIMINARY/FINAL PLAN SUBMISSION.
2. SALDO SECTION 145–33.B.(1) – REGARDING THE MINIMUM HORIZONTAL PLAN SCALE REQUIREMENT OF ONE INCH EQUALS 100 FEET FOR LOTS GREATER THAN ONE (1) ACRE AND TO ALLOW OVERALL PLAN VIEWS DRAWN AT SCALES OF ONE INCH EQUALS 200, 300, AND 400 FEET.
3. SALDO SECTIONS 145–33.C.(1) AND 145–34.C.(3) – REGARDING THE IDENTIFICATION OF EXISTING FEATURES WITHIN 500 FEET OF THE PROPERTY.
4. SALDO SECTION 145–33.C.(2) – REGARDING THE IDENTIFICATION OF EXISTING CONTOUR LINES WITHIN 500 FEET OF THE PROPERTY.
5. SALDO SECTIONS 145–33.F.(1)(a) AND 145–34.C.(9)(a) AND APPENDIX B–7 – REGARDING THE REQUIREMENT THE DRAINAGE FACILITIES MAINTENANCE NOTES REFERENCE DRAINAGE EASEMENTS.
6. SALDO SECTION 145–34.D.(5) – REGARDING THE REQUIREMENT TO PROVIDE AN AGREEMENT, AS A COVENANT RUNNING WITH THE LAND, DESCRIBING THE PROPERTY OWNER'S RESPONSIBILITIES FOR THE OPERATION AND MAINTENANCE OF STORMWATER MANAGEMENT FACILITIES AND BMP'S IN ACCORDANCE WITH THE DEVELOPER'S POST–CONSTRUCTION OPERATION AND MAINTENANCE PLAN.
7. SALDO SECTIONS 145–41.B.(4) AND 145–45.B.(3), (4), AND (9) – REGARDING THE REQUIREMENT TO PROVIDE ADDITIONAL RIGHT–OF–WAY AND CARTWAY WIDTHS, CURB AND SIDEWALK ALONG APPLEBUTTER ROAD, RIVERSIDE DRIVE AND SKYLINE DRIVE.
8. SALDO SECTION 145–46.B.(3) – REGARDING THE REQUIREMENT TO PROVIDE STORM DRAINAGE EASEMENTS.
9. SECTIONS 145–30 AND 34.D(6) – TO USE EXISTING LIABILITY INSURANCE (AND AMEND AS FOUND ACCEPTABLE TO THE TOWNSHIP SOLICITOR).
10. SECTION 145–45.G(2) – TO PERMIT DRIVEWAYS AS DETAILED THAT DO NOT MEET THE REQUIRED PAVEMENT WIDTHS AND THICKNESSES.

STORMWATER MANAGEMENT ORDINANCE

1. SECTION 137–18.E – TO PERMIT SMALLER BASIN ORIFICES (1–INCH AND 2–INCH) THAN THE MINIMUM REQUIRED ORIFICE (3–INCH).
2. SECTION 137–18.H – TO PERMIT THE OUTSIDE PERIMETER FENCING TO SERVE AS THE BASIN FENCING.
3. SECTION 137–18.I. – TO PERMIT THE BASINS TO HAVE STORAGE DEPTHS TO EXCEED THE MAXIMUM BASIN DEPTH PERMITTED (3 FEET), TO PERMIT BASIN INTERIOR SLOPES (2:1 AND 3:1) THAT ARE STEEPER THAN ARE REQUIRED (5:1), TO NOT REQUIRE FENCING AND TO NOT REQUIRE THE BASIN TO DRAIN DOWN WITH THE PRESCRIBED TIMES (4 HOURS AND 8 HOURS).
4. SECTION 137–18.N MINIMUM BASIN BOTTOM SLOPE 1%
5. SMO SECTION 137–19.G.(8) – REGARDING THE PENNSYLVANIA DEPARTMENT OF TRANSPORTATION DESIGN STANDARDS FOR INLET AND MANHOLE CASTINGS AND CONCRETE CONSTRUCTION.
6. SMO SECTION 137–19.G.(10) – REGARDING THE REQUIREMENT THAT OPEN–END PIPES MUST BE FITTED WITH CONCRETE END WALLS OR WING WALLS, IN ACCORDANCE WITH PENNDOT STANDARDS, AND PROVIDE A THIRTY INCH (30") CONCRETE FOOTING AND TO ALLOW FLARED END SECTIONS.
7. SMO SECTION 137–19.G.(14) – REGARDING THE REQUIREMENT THAT FIXED PIPE CONVEYANCE OF STORMWATER MUST BE TO THE SAME DESTINATION AS STORMWATER WOULD BE CONVEYED OVERLAND IF THE FIXED PIPE CONVEYANCE SYSTEM WERE TO FAIL.
8. SMO SECTION 137–23.M – REGARDING THE REQUIREMENT THAT NO GROUND MAY BE PROPOSED OR ALTERED TO EXCEED A SLOPE STEEPER THAN ONE (1) VERTICAL FOR THREE (3) HORIZONTAL AND TO ALLOW A PROPOSED SLOPE OF ONE (1) VERTICAL FOR TWO (2) HORIZONTAL.
9. SMO SECTION 137–26.D AND E, –34, –36, –37 AND –38 – REGARDING THE REQUIREMENT TO PROVIDE A LEGAL AGREEMENT BETWEEN THE OWNER AND TOWNSHIP DESCRIBING THE OWNER'S RESPONSIBILITY FOR STORMWATER MANAGEMENT FACILITY OWNERSHIP, MAINTENANCE, REPAIR AND REPLACEMENT.
10. SMO SECTION 137–37.B AND C – REGARDING THE REQUIREMENT TO PROVIDE EASEMENTS AROUND ANY PROPOSED STORMWATER MANAGEMENT FACILITIES.
11. SMO APPENDIX I – REGARDING THE REQUIREMENT TO PROVIDE THE STORM DRAINAGE MAINTENANCE AND EASEMENT NOTES ON THE PLANS.

ZONING APPROVAL:

IN 1993, 2001, AND 2016 THE LOWER SAUCON TOWNSHIP ZONING HEARING BOARD GRANTED SPECIAL EXCEPTION APPROVAL TO UTILIZE 206 ACRES OF THE SUBJECT PARCEL FOR LANDFILL USE.

ON THE LOWER SAUCON TOWNSHIP ZONING HEARING BOARD GRANTED SPECIAL EXCEPTION APPROVAL WITH CONDITIONS FOR THE PROPOSED NORTHERN REALIGNMENT FACILITY DETAILED ON THESE PLANS. THE CONDITIONS OF THE SAID APPROVAL ARE AS FOLLOWS:

GENERAL NOTES:

1. DEVELOPMENT PROPOSED HEREIN IS WITHIN AN EXISTING 224.471 ACRE TRACT OWNED BY BETHLEHEM LANDFILL COMPANY AS RECORDED IN NORTHAMPTON COUNTY COURTHOUSE DEED BOOK VOLUME 2000–1, PG. 88738 AND BEING TAX PARCEL P7/5/33. AS DESCRIBED HEREIN THE EXISTING 224.471 ACRE TRACT IS TO BE CONSOLIDATED WITH TWO (2) TRACTS (FORMERLY HELMS & REDDINGTON) INCREASING THE DEVELOPMENT TRACT ACREAGE TO 423.328 ACRES.
2. NO LANDFILL OPERATIONS WILL TAKE PLACE BEYOND THE EXISTING PADEP PERMIT BOUNDARY AS PART OF THIS PROPOSED NORTHERN REALIGNMENT.
3. UTILITY LOCATIONS SHOWN ON ALL PLAN SHEETS SHALL BE FIELD VERIFIED IN ACCORDANCE WITH PA ACT 187 PRIOR TO ANY EXCAVATION.
4. NO DEVELOPMENT IS PROPOSED WITHIN OR DIRECTLY ADJACENT TO PUBLIC RIGHTS OF WAY OF SKYLINE DRIVE, RIVERSIDE DRIVE AND APPLEBUTTER ROAD.
5. LOWER SAUCON AUTHORITY SHALL HAVE PERMANENT AND UNRESTRICTED ACCESS TO ITS FACILITIES OVER LANDS OF BETHLEHEM LANDFILL COMPANY VIA THE PERIMETER ACCESS ROAD AND THE VARIOUS UTILITY EASEMENTS SHOWN.
6. SOME SITE INFORMATION FOR THESE PLANS HAS BEEN COMPILED FROM DRAWINGS FURNISHED BY GANNETT FLEMING, INC. OF HARRISBURG, PENNSYLVANIA AND AMERICAN RESOURCE CONSULTANTS, INC. OF DOYLESTOWN, PENNSYLVANIA.
7. BASE MAPPING CREATED BY COMPILING TOPOGRAPHY FROM LOCKWOOD MAPPING CO. DATED 2–2–99 & TVGA ENGINEERING, SURVEYING, P.C. DATED APRIL 1998. MAPPING HAS BEEN FIELD VERIFIED. DISPOSAL AREA INFORMATION TAKEN FROM PHASE III PERMIT DWGS. BY GANNETT FLEMING. DATED NOV. 9, 1993. PROPERTY LINE DATA TAKEN FROM PLAN BY KEYSTONE CONSULTING ENGINEERS, INC. REVISED THRU 12–13–00.
8. NO TOPSOIL SHALL BE REMOVED FROM THE SITE EXCEPT FOR TOPSOIL STRIPPED FROM STREET CARTWAY AREAS OR OTHER PAVED AREAS. A MINIMUM OF FOUR (4) INCHES OF TOPSOIL SHALL BE UNIFORMLY DISTRIBUTED OVER AREAS STRIPPED FOR CONSTRUCTION BEYOND THOSE AREAS COVERED BY STRUCTURES AND PAVING.
9. "EXISTING CONDITIONS" AS DEPICTED HEREIN CONSIST OF EITHER ACTUAL FIELD CONDITIONS TAKEN FROM THE REFERENCED AERIAL PHOTOGRAPHY OR THOSE PREVIOUSLY APPROVED CONDITIONS AS OUTLINED WITHIN THE SOUTHEASTERN REALIGNMENT AND RNG FACILITY LAND DEVELOPMENT PLANS.
10. AS BUILT PLANS SHALL BE PROVIDED AS REQUIRED, OR A CERTIFICATION LETTER THAT THE FACILITIES WERE INSTALLED PER PLAN TO THE LOWER SAUCON TOWNSHIP.
11. THIS PLAN PROPOSES NO CHANGES TO THE LANDFILL OPERATION. ADDITIONAL DISPOSAL AREA INCLUDING ON TOP EXISTING WASTE IS PROPOSED ON 29 ACRES. AS SUCH A MAJOR MODIFICATION SOLID WASTE PERMIT APPLICATION CONSIST WITH THESE PLANS SHALL BE FILED WITH THE PADEP. FOR APPROVAL PRIOR TO COMMENCEMENT OF DEVELOPMENT.
12. THE OWNER ACKNOWLEDGES THAT PADEP REGULATES, INSPECTS AND REQUIRES MAINTENANCE BONDING FOR THE STORMWATER FACILITIES WITHIN THE PADEP PERMIT BOUNDARY, AND THE OWNER MUST MAINTAIN SAID APPROVED FACILITIES IN ACCORDANCE WITH THE APPROVED DESIGNS.
13. THE OWNER WILL POST A BOND WITH PADEP, IN AN AMOUNT THAT PADEP DETERMINES TO BE SUFFICIENT TO INSURE SITE CLOSURE AND POSTCLOSURE IN ACCORDANCE WITH THE PADEP'S APPLICABLE REGULATIONS. THE OWNER ACKNOWLEDGES THAT "CLOSURE" IS DEFINED BY PADEP REGULATIONS AS THE DATE ON WHICH THE FACILITY CEASES TO ACCEPT WASTE; THAT "FINAL CLOSURE" IS THE DATE AFTER WHICH NO FURTHER SITE TREATMENT, MAINTENANCE, OR OTHER ACTION IS OR WILL BE NECESSARY TO ENSURE COMPLIANCE WITH PADEP REGULATIONS; THAT THE DATE OF PADEP'S FINAL CLOSURE CERTIFICATION SHALL BE THE DATE OF COMMENCEMENT OF THE 10–YEAR BOND LIABILITY PERIOD FOLLOWING FINAL CLOSURE [25 PA. CODE 271.342 (e)]; THAT OWNER'S REQUEST FOR BOND RELEASE SHALL BE CONSIDERED A MAJOR PERMIT MODIFICATION (INCLUDING PUBLIC NOTICE AND PUBLIC COMMENTS) [25 PA. CODE 271.341(e)] AND THE RELEASE OF BOND DOES NOT CONSTITUTE A WAIVER OR RELEASE OF LIABILITY PROVIDED IN LAW [25 PA. CODE 271.341 (g) (2)].

STORM DRAINAGE MAINTENANCE:

THE OWNERS, THEIR HEIRS, ASSIGNEES, AND/OR GRANTEES OF THE PROPERTY SHOWN ON THIS PLAN SHALL BE RESPONSIBLE FOR THE OPERATION, MAINTENANCE, REPAIR, RECONSTRUCTION AND/OR REPLACEMENT OF THE STORMWATER MANAGEMENT FACILITIES, INCLUDING BUT NOT LIMITED TO INLETS, OUTLETS, DRAINAGE PIPE(S), ENERGY DISSIPATION FACILITIES, FENCING, DRAINAGE SWALE(S), BASIN(S), BEST MANAGEMENT PRACTICE (BMP) FACILITIES, STILLING BASIN(S), DETENTION FACILITIES, NATURAL WATERCOURSES AND POND(S), WHICH ARE LOCATED WITHIN THE BOUNDARIES OF THE PROPERTY. SAID MAINTENANCE SHALL INCLUDE, BUT NOT BE LIMITED TO CLEANING, REMOVAL OF POLLUTANTS AND DEBRIS, REPAIR OF EROSION CONDITIONS, CLOSURE OF SINKHOLES, AND MAINTENANCE OF VEGETATION. NO BUILDING OR STRUCTURE SHALL BE CONSTRUCTED WITHIN THE DRAINAGE FACILITIES SHOWN ON THE PLANS APPROVED BY THE TOWNSHIP OF LOWER SAUCON, NOR SHALL THE STORMWATER MANAGEMENT FACILITIES PLANNED FOR BE ALTERED FROM DESIGN CONDITIONS SHOWN ON PLANS APPROVED BY THE TOWNSHIP OF LOWER SAUCON WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE TOWNSHIP OF LOWER SAUCON.

NEIGHBORHOOD PROTECTION:

BETHLEHEM LANDFILL COMPANY SHALL COMPLY WITH THE REQUIREMENTS OF ZONING ORDINANCE SECTION 180–96 OF THE LOWER SAUCON TOWNSHIP ZONING ORDINANCE AS IT PERTAINS TO GENERAL PERFORMANCE STANDARDS REGARDING NEIGHBORHOOD PROTECTION IN SO FAR AS THESE STANDARDS ARE WITHIN THE LIMITATIONS OF NORMAL LANDFILL OPERATIONS AND PROCEDURES.

PENNDOT OCCUPANCY PERMITS:

A) DRIVEWAY ACCESS IMPROVEMENTS TO A STATE HIGHWAY SHALL BE AUTHORIZED ONLY BY HIGHWAY OCCUPANCY PERMIT ISSUED BY THE PENNSYLVANIA DEPARTMENT OF TRANSPORTATION, AS REQUIRED PURSUANT TO SECTION 420 OF THE ACT OF JUNE 1, 1945, P.L. 1242, NO. 428, KNOWN AS THE "STATE HIGHWAY LAW" (36 P.S. 670–420).

B) BUILDING PERMITS SHALL NOT BE ISSUED UNTIL OR AFTER SAID HIGHWAY OCCUPANCY PERMIT HAS BEEN ISSUED.

C) APPROVAL OF THIS PLAN DOES NOT REPRESENT ANY GUARANTY OR ASSURANCE BY LOWER SAUCON TOWNSHIP THAT A HIGHWAY OCCUPANCY WILL BE ISSUED BY THE PENNSYLVANIA DEPARTMENT OF TRANSPORTATION.

D) NO MODIFICATIONS ARE PROPOSED TO THE EXISTING LANDFILL ACCESS FROM APPLEBUTTER ROAD.

E) ALL CURRENT AND FUTURE OWNERS ARE HEREBY NOTIFIED OF THE REQUIREMENT THAT THEY INSTALL AT THEIR SOLE COST AND EXPENSE, CURBING IN ACCORDANCE WITH TOWNSHIP SPECIFICATIONS IF AND WHEN LOWER SAUCON TOWNSHIP OR PENNDOT INSTALLS CURBING ALONG APPLEBUTTER ROAD.

DRAINAGE FACILITIES MAINTENANCE NOTES:

A) ALL DRAINAGE FACILITIES SHOWN ON THIS PLAN SHALL BE MAINTAINED IN A GRASSED OR OTHERWISE IMPROVED CONDITION IN ACCORDANCE WITH THE GRADES AND DESIGNS SHOWN ON THE APPROVED DEVELOPMENT PLANS FOR THIS PROJECT. ALL THESE FACILITIES SHALL BE KEPT FREE OF ALL OBSTRUCTION, INCLUDING BUT NOT LIMITED TO SUCH OBSTRUCTIONS AS FILL, TEMPORARY OR PERMANENT STRUCTURES AND PLANTS (OTHER THAN GRASS). THE MAINTENANCE OF ALL SUCH FACILITIES SHALL BE THE RESPONSIBILITY OF THE LOT OWNER ON WHICH THE FACILITIES EXISTS.

B) DRAINAGE FACILITIES SHALL ALLOW THE PASSAGE OF STORMWATER IN UNDERGROUND STORM SEWER PIPING AND ASSOCIATED STRUCTURES AND/OR ALLOW PASSAGE OF STORMWATER OVER THE SURFACE OF THE GROUND AND SHALL ALLOW ACCESS ACROSS THE AREA FOR PURPOSES OF MAINTENANCE OF THE STORM CONVEYANCE SYSTEMS.

C) EXISTING ROADSIDE GUTTERS OR SWALES SHALL NOT BE OBSTRUCTED BY DRIVEWAYS OR OTHER FILL OR STRUCTURES.

RIPARIAN CORRIDOR BUFFER, WETLANDS, FLOODPLAIN:

A) THE RIPARIAN CORRIDOR BUFFERS AS ILLUSTRATED HEREIN IS SUBJECT TO THE RESTRICTIONS OUTLINED IN SECTION 180–95(7) OF THE LOWER SAUCON TOWNSHIP CODE. THE RIPARIAN BUFFERS DEPICTED WERE TAKEN FROM PHASE IV AND SOUTHEASTERN REALIGNMENT LAND DEVELOPMENT PLANS PREPARED BY MARTIN AND MARTIN DATED NOVEMBER 2011 OR AS IDENTIFIED ON THESE PLANS.

B) WETLANDS DELINEATION AS PER THE PHASE III CITY OF BETHLEHEM LANDFILL PA D.E.R. PERMIT APPLICATION. THOSE WETLANDS LOCATED WITHIN THE LIMITS OF THIS PHASE IV APPLICATION WERE REDELINEATED BY SETH BACON, WETLANDS CONSULTANT, REVIEWED AND CONFIRMED BY THE U.S. ARMY CORP OF ENGINEERS.THOSE WETLANDS LOCATED ADJACENT TO THE SOUTHEASTERN REALIGNMENT WERE REDELINEATED BY RODMER GEOLOGICAL SERVICES, WETLAND CONSULTANT, REVIEWED AND CONFIRMED BY THE USACE IN 2014. NO WETLANDS EXIST WITHIN THE AREA OF THE PROPOSED DEVELOPMENT.

C) BASED UPON AN EXAMINATION OF THE LOWER SAUCON TOWNSHIP FLOOD INSURANCE RATE MAPPING AS PREPARED BY FEMA, THERE IS IDENTIFIED FLOOD PLAIN ASSOCIATED WITH THE SUBJECT PROPERTY WHICH LIES ENTIRELY IN ZONE X. SAID FLOODPLAIN IS IDENTIFIED ON THESE PLANS BEING LOCATED ON THE FORMER REDDINGTON PARCEL.

D) THE GRANT OF A PERMIT OR APPROVAL OF A SUBDIVISION AND/OR LAND DEVELOPMENT PLAN IN OR NEAR FLOODPLAIN AREAS SHALL NOT CONSTITUTE A REPRESENTATION, GUARANTY OR WARRANTY OF ANY KIND BY THE TOWNSHIP OR AN OFFICIAL, CONSULTANT OR EMPLOYEE THEREOF OF THE PRACTICABILITY OR SAFETY OF THE PROPOSED USE, AND THE OWNERS HEREBY AGREE AND ACKNOWLEDGE THAT SUCH PERMITS OR APPROVALS SHALL NOT CREATE ANY LIABILITY UPON THE TOWNSHIP, ITS OFFICIAL, EMPLOYEES OR CONSULTANTS.

LEHIGH VALLEY PLANNING COMMISSION REVIEW

Reviewed by the Leigh Valley Planning Commission

_____ _____
DATE PLANNER

TOWNSHIP PLANNING COMMISSION RECOMENDATIONS

Recommended for approval by the Lower Saucon Township Planning Commission this

_____day of _____20___.

_____ _____
CHAIRMAN SECRETARY

TOWNSHIP COUNCIL APPROVAL AND TOWNSHIP ENGINEER REVIEW

Approved by the Lower Saucon Township Council this

_____day of _____20___.

_____ _____
SECRETARY COUNCIL PRESIDENT

Reviewed by:

_____
TOWNSHIP ENGINEER

This _____ day of _____20___.

UTILITY CONTACTS:

WATER / SEWER:
LOWER SAUCON AUTHORITY
3700 OLD PHILADELPHIA PIKE
BETHLEHEM, PENNSYLVANIA 18015
PH: (610) 317–3212
EMAIL: administrator@lowersauconauthority.org

GAS:
CALPINE ENERGY CENTER
2254 APPLEBUTTER ROAD
BETHLEHEM, PENNSYLVANIA 18015
PH:(601) 861–6130

UGI UTILITIES, INC
P.O. BOX 13009
READING, PA 19612
PH: (800) 276–2722
EMAIL: customerservice@ugi.com

STORM SEWER:
LOWER SAUCON TOWNSHIP – PUBLIC WORKS
CONTACT: ROGER RASICH
3700 OLD PHILADELPHIA PIKE
BETHLEHEM, PENNSYLVANIA 18015
PH:(610) 865–3291
EMAIL: drpw@lowersauconstownship.org

SANITARY SEWER:
WASTE CONNECTIONS
CONTACT: DAVID PANNUCCI
2335 APPLEBUTTER ROAD
BETHLEHEM, PENNSYLVANIA 18015
PH:(610) 317–3200
EMAIL:
david.pannucci@wasteconnections.com

ELECTRIC:
PPL ELECTRIC UTILITIES
827 HAUSMAN ROAD
ALLENTOWN, PA 18104
PH:(888) 220–9991

DESIGN ENGINEER CERTIFICATION

I hereby certify that I have designed all site and public improvements and have identified all floodplain limits as required for this subdivision or land development.

AUGUST 10, 2020 _____
DATE REGISTERED ENGINEER

COMMONWEALTH OF PENNSYLVANIA – REGISTERED PROFESSIONAL – JOSEPH MICHAEL MCDOWELL – ENGINEER – NO.057089E

SURVEYOR'S CERTIFICATION

I hereby certify that this plan represents a survey and design made by or for me that all dimensional details are correct to the best of my knowledge and belief.

AUGUST 10, 2020 _____
DATE REGISTERED SURVEYOR

COMMONWEALTH OF PENNSYLVANIA – REGISTERED – SAMUEL DAVID RUNYON – SURVEYOR – No.3576-E

CARBONATE GEOLOGY CERTIFICATION

I hereby certify that the facilities are not underlain by carbonate geology.

AUGUST 10, 2020 _____
DATE REGISTERED GEOLOGIST

WETLAND SPECIALIST CERTIFICATION

I hereby certify that I performed the wetland survey for those wetlands depicted on the former Helms and Redington Parcels of the Consolidated Lot.

OCTOBER 27, 2020 _____
DATE WETLAND SPECIALIST

COMMONWEALTH OF PENNSYLVANIA – REGISTERED PROFESSIONAL – TODD ANDREW LOWREY – No. 3803-E

OWNER'S CERTIFICATION

COMMONWEALTH OF PENNSYLVANIA
COUNTY OF NORTHAMPTON

We, the undersigned, the owners of the property shown on this plan, being duly sworn according to law, depose and say that we are sole owners of this property in peaceful possession of the same and that no suits pending affecting the title of the same. We further depose and say that this plan was made at our direction and that we desire the same to be recorded.

DAVID PANNUCCI
(OWNER) PRINT

(OWNER) SIGNATURE

Sworn to and subscribed before me this

_____day of _____20___.

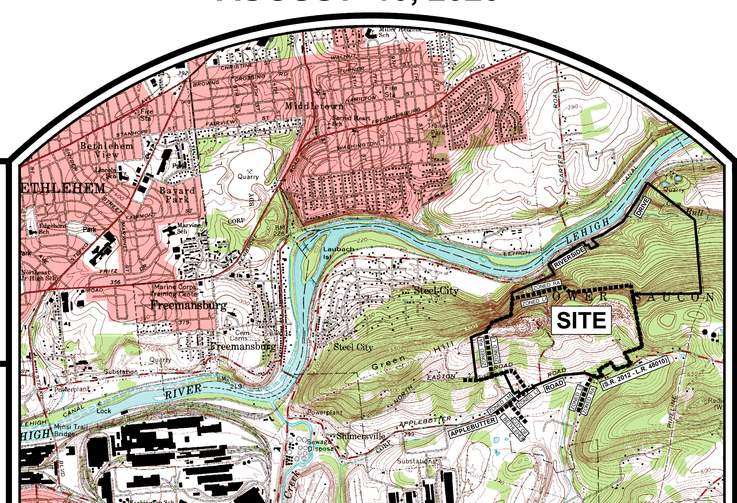
_____
NOTARY PUBLIC

AUGUST 10, 2020

LOWER SAUCON TWP.

REV. OCTOBER 29, 2020

NORTHAMPTON COUNTY



LOCATION MAP | N | SCALE: 1" = 2,000'

OWNER / APPLICANT

BETHLEHEM LANDFILL COMPANY
2335 APPLEBUTTER ROAD
BETHLEHEM, PA 18015

PREPARED BY:

martin and martin, Inc.
phone: (717) 264–6759
37 South Main Street • Suite A
Chambersburg, Pennsylvania 17201

TABLE OF CONTENTS

SUPPLEMENTAL PLANS:

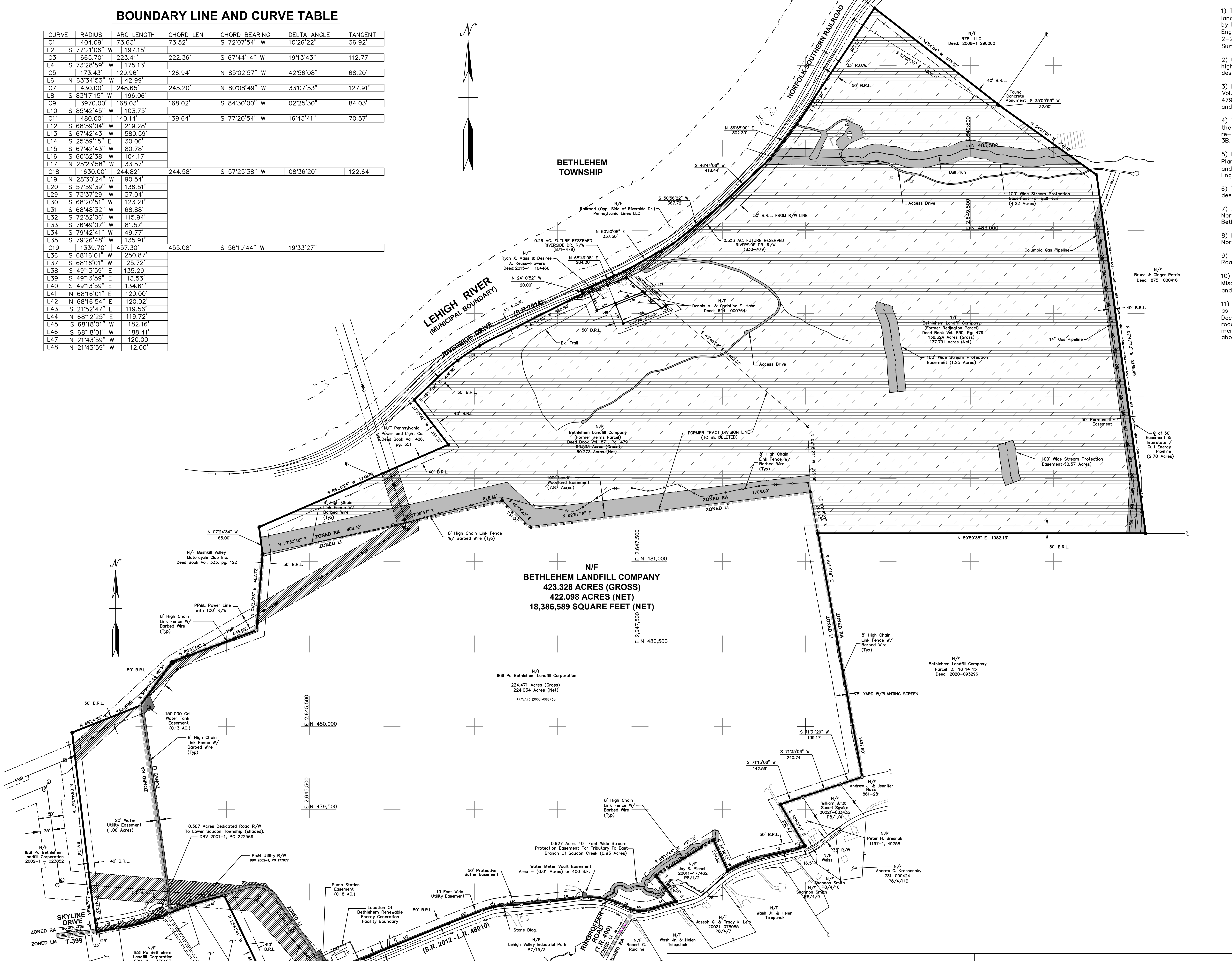
EROSION AND SEDIMENTATION CONTROL PLAN (ES-1 TO ES-19)
* POST CONSTRUCTION STORMWATER MANAGEMENT PLAN (PC1 TO PC-7)

* PLANS TO BE RECORDED

FILE: 1162.4 (NORTHERN EXPANSION) 1162.4–LDP–01.dwg

BOUNDARY LINE AND CURVE TABLE

CURVE	RADIUS	ARC LENGTH	CHORD LEN	CHORD BEARING	DELTA ANGLE	TANGENT
C1	404.09'	73.63'	73.52'	S 72°07'54" W	10°26'22"	36.92'
L2	S 77°21'06" W	197.15'				
C3	665.70'	223.41'	222.36'	S 67°44'14" W	19°13'43"	112.77'
L4	S 73°28'59" W	175.13'				
C5	173.43'	129.96'	126.94'	N 85°02'57" W	42°56'08"	68.20'
L6	N 63°34'53" W	42.99'				
C7	430.00'	248.65'	245.20'	N 80°08'49" W	33°07'53"	127.91'
L8	S 83°17'15" W	196.06'				
C9	3970.00'	168.03'	168.02'	S 84°30'00" W	02°25'30"	84.03'
L10	S 85°42'45" W	103.75'				
C11	480.00'	140.14'	139.64'	S 77°20'54" W	16°43'41"	70.57'
L12	S 68°59'04" W	219.28'				
L13	S 67°42'43" W	580.59'				
L14	S 25°59'15" E	30.06'				
L15	S 67°42'43" W	80.78'				
L16	S 60°52'38" W	104.17'				
L17	N 25°23'58" W	33.57'				
C18	1630.00'	244.82'	244.58'	S 57°25'38" W	08°36'20"	122.64'
L19	N 28°30'24" W	90.54'				
L20	S 57°59'39" W	136.51'				
L29	S 73°37'29" W	37.04'				
L30	S 68°20'51" W	123.21'				
L31	S 68°48'32" W	68.88'				
L32	S 72°52'06" W	115.94'				
L33	S 76°49'07" W	81.57'				
L34	S 79°42'41" W	49.77'				
L35	S 79°26'48" W	135.91'				
C19	1339.70'	457.30'	455.08'	S 56°19'44" W	19°33'27"	
L36	S 68°16'01" W	250.87'				
L37	S 68°16'01" W	25.72'				
L38	S 49°13'59" E	135.29'				
L39	S 49°13'59" E	13.53'				
L40	S 49°13'59" E	134.61'				
L41	N 68°16'01" E	120.00'				
L42	N 68°16'54" E	120.02'				
L43	S 21°52'47" E	119.56'				
L44	N 68°12'25" E	119.72'				
L45	S 68°18'01" W	182.16'				
L46	S 68°18'01" W	188.41'				
L47	N 21°43'59" W	120.00'				
L48	N 21°43'59" W	12.00'				



NOTES:

1) This Plan is based upon a field boundary survey conducted February 17 to March 25, 1998 (existing landfill property described in DBV 1998–1, pg. 93368) and June 9 to 22, 2000 (three additional tracts) by Keystone Consulting Engineers Inc. Information is taken from plans prepared by Keystone Consulting Engineers, Inc entitled "Final Lot Line Change and Land Development Plan" (dated 3–3–93, revised 2–28–01), "Property Boundaries" and "Corner Details" (date 6–30–00, revised 12–4–00), and "Boundary Survey along Lands now or formerly of City of Bethlehem" (Date 3–31–1998, Revised 7–16–98).

2) Utility locations have not been shown on this plan as part of this survey. Certain utility poles and high tension towers have been shown for general site orientation only. PP&L Utility easement centerline descriptions were calculated, but not field surveyed nor specified in the easements.

3) Deed References: Northampton County Deed Books Vol. 1998–1, pg. 93368, Vol. 1998–1, pg. 110131, Vol. 787 pg. 94, and Vol. 1998–1, pg. 176936, Vol. 871, pg. 479, Vol. A91, pg. 140, Vol. 830, pg. 479, Vol. G72, pg. 484, Vol. 488. pg. 602, Vol. 751, pg. 614, Misc. Vol. 415, pg. 446 (Condemnation) and as shown on plan.

4) This plan depicts a plane survey. Bearings and coordinates as shown upon this plan are based upon the Pennsylvania State Plane Coordinate System – NAD 83 (international foot conversion) as re–established for this survey using a baseline as indicated on City of Bethlehem Phase 3, Cells 3A and 3B, City Project LF–94–W01 drawings.

5) Property line reflects boundary information taken from "Final Lot Line Change and Land Development Plan" prepared by Keystone Consulting Engineers, Inc. recorded in Map Book Volume 2001–5, Page 290, and "Boundary Survey along lands now or formerly of City of Bethlehem prepared by Keystone Consulting Engineers, Inc. Dated 3–31–1998, Revised 7–16–98.

6) The woodland preservation easement on the City of Bethlehem land, recorded in Northampton County deedbook Volume 1994–6, Page 12081, is acknowledged by Bethlehem Landfill Company.

7) A Scenic Conservation Easement on the Former Helms and Reddington Parcels, Recorded in Northampton County Deedbooks 1994–6, Page 12074 and 1994–6, Page 12081, is Acknowledged by Bethlehem Landfill Company.

8) Monitoring wells on the City of Bethlehem land are accessible by easement as recorded in Northampton County deedbook Volume 1998–1, Page 093435.

9) Property subject to a proposed 10 feet wide utility easement along the Northerly R/W of Applebutter Road as shown.

10) Lower Saucon Authority waterline easements are plotted in accordance with the following documents: Misc 503, PG 437 (Pump Station Easement); Record Book 1994–6, PG 77878 (150,000 Gal. Water Tank and Dual Pipeline Easement) as recorded in Northampton County.

11) Lands N/F of Dennis and Christine Hahn and N/F of Ryan X. Mass and Desiree A. Reuss–Flowers as shown represent their Record Boundaries as described in their respective Deeds of Record. Both Deeds refer to a "Plan of Lots laid out by Abraham S. Shimer" and describe Boundaries along certain roads that were never opened. The Deeds do not mention the width of the said streets and the above mentioned plan was not recorded. This survey subject to any rights that may exist in the area of the above mentioned roads.

LEGEND

○	EX. IRON PIN, IRON PIPE, RR SPIKE, PK NAIL, OR NAIL SPIKE.
●	PREVIOUSLY SET IRON PIN, PK NAIL OR RR SPIKE. AS PER KEYSTONE ENGINEERING SURVEY.
⊗	FOUND RAILROAD MONUMENT
✿	SIGNIFICANT TREE FOUND
⊛	FOUND STONE CORNER
⊞	FOUND RR TIE ON END
□	FOUND CONCRETE MONUMENT
●	UTILITY POLE
⊠	HIGH TENSION TRANSMISSION LINE TOWER
×	ANGLE IRON/FENCE POST FOUND
— — — —	BUILDING RESTRICTION LINE (B.R.L.)
━━━━	PROPERTY LINE(423.328 AC. CONSOLIDATED LOT)
——-–-——	EASEMENT LINE
—-–—-–—	RIGHT OF WAY LINE
————	ADJOINING PROPERTY LINE – R/W LINE
————	EDGE OF ROAD
—×—×—×—	FENCE
—— – —— – ——	CENTERLINE
○○○○○○○○	STONE ROW FOUND
– – – – – – –	FACILITY LICENSE BOUNDARY (BETHLEHEM RENEWABLE ENERGY, LLC)
————	FORMER DEED DIVISION LINE
—GAS—GAS—GAS—	TC ENERGY (COLUMBIA GAS TRANSMISSION)
——PWR——	PP&L POWER LINE
▮▮▮▮▮▮▮▮	ZONING BOUNDARY (LI – LIGHT INDUSTRIAL RA = RURAL AGRICULTURAL LM = LIGHT MANUFACTURING
▨	R/W AREAS = 11.07 ACRES (FUTURE DEDICATED OR DEDICATED ROAD R/W = 1.23 AC.)
▩	EASEMENT AREAS = 16.31 ACRES
▤	SCENIC CONSERVATION EASEMENT ACREAGE = 198.857 ACRES

OWNER'S CERTIFICATION

COMMONWEALTH OF PENNSYLVANIA
COUNTY OF NORTHAMPTON

We, the undersigned, the owners of the property shown on this plan, being duly sworn according to law, depose and say that we are sole owners of this property in peaceful possession of the same and that no suits pending affecting the title of the same. We further depose and say that this plan was made at our direction and that we desire the same to be recorded.

DAVID PANNUCCI
(OWNER) PRINT

(OWNER) SIGNATURE

Sworn to and subscribed before me this

______________day of ________________20___.

NOTARY PUBLIC

LEHIGH VALLEY PLANNING COMMISSION REVIEW

Reviewed by the Leigh Valley Planning Commission

DATE PLANNER

TOWNSHIP PLANNING COMMISSION RECOMENDATIONS

Recommended for approval by the Lower Saucon Township Planning Commission this

______________day of __________________20___.

CHAIRMAN SECRETARY

TOWNSHIP COUNCIL APPROVAL AND TOWNSHIP ENGINEER REVIEW

Approved by the Lower Saucon Township Council this

______________day of __________________20___.

SECRETARY COUNCIL PRESIDENT

Reviewed by:

TOWNSHIP ENGINEER

This _____________ day of ______________20___ .

NO.	REVISION	DATE
1	LOT CONSOLIDATION	10/29/20

JOSEPH MICHAEL McDOWELL
ENGINEER
NO.057039E

PROPERTY BOUNDARY AND LOT CONSOLIDATION PLAN

LOWER SAUCON TWP. NORTHAMPTON CO.
PRELIMINARY / FINAL LAND DEVELOPMENT PLAN, SITE PLAN AND LOT CONSOLIDATION PLAN

Bethlehem Landfill Company

PENNSYLVANIA

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

PROJ. NO.	DWN. BY:	SCALE:
1162.4	MSH/DB	300' 150' 0 300' 600' Scale: 1" = 300'
DSN. BY: JM	CHK. BY: RMB	

CADD FILE:
1162.4–LDP–02.dwg

DATE:
08/10/20

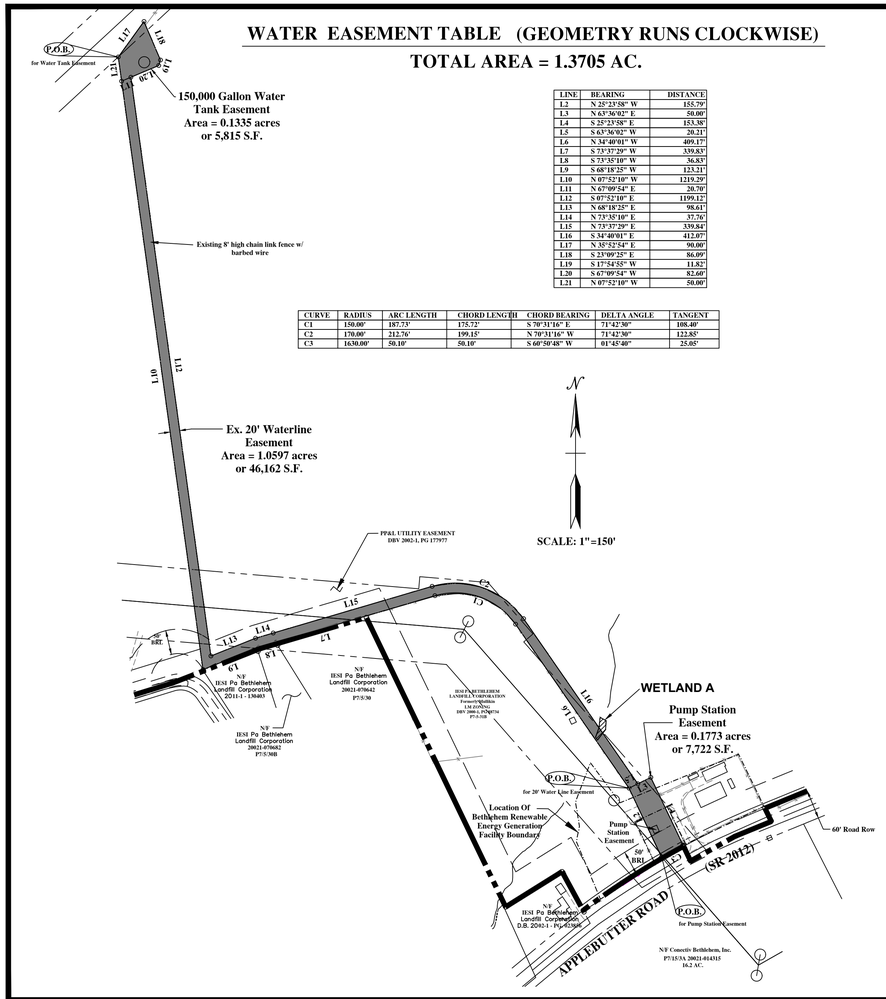
SCALE:
1" = 300'

DRAWING NO.
2 of 17

FILE: 1162.4 (NORTHERN EXPANSION) 1162.4–LDP–02.dwg

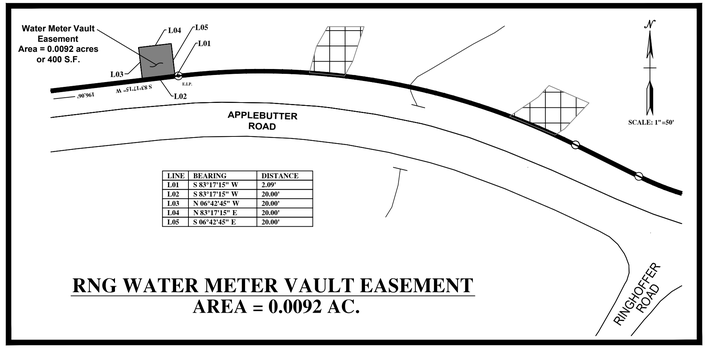
WATER EASEMENT TABLE (GEOMETRY RUNS CLOCKWISE)

TOTAL AREA = 1.3705 AC.



LINE	BEARING	DISTANCE
L2	N 25°23'58" W	155.79'
L3	N 63°36'02" E	50.00'
L4	S 25°23'58" E	153.38'
L5	S 63°36'02" W	20.21'
L6	N 34°40'01" W	409.17'
L7	S 73°37'29" W	339.83'
L8	S 73°35'10" W	36.83'
L9	S 68°18'25" W	123.21'
L10	N 07°52'10" W	1319.29'
L11	N 67°09'54" E	20.70'
L12	S 07°52'10" E	1199.12'
L13	N 68°18'25" E	98.61'
L14	N 73°35'10" E	37.76'
L15	N 73°37'29" E	339.84'
L16	N 34°40'01" E	412.07'
L17	N 35°52'54" E	90.00'
L18	S 23°09'25" E	86.09'
L19	S 17°54'55" W	11.82'
L20	S 67°09'54" W	82.60'
L21	N 07°52'10" W	50.00'

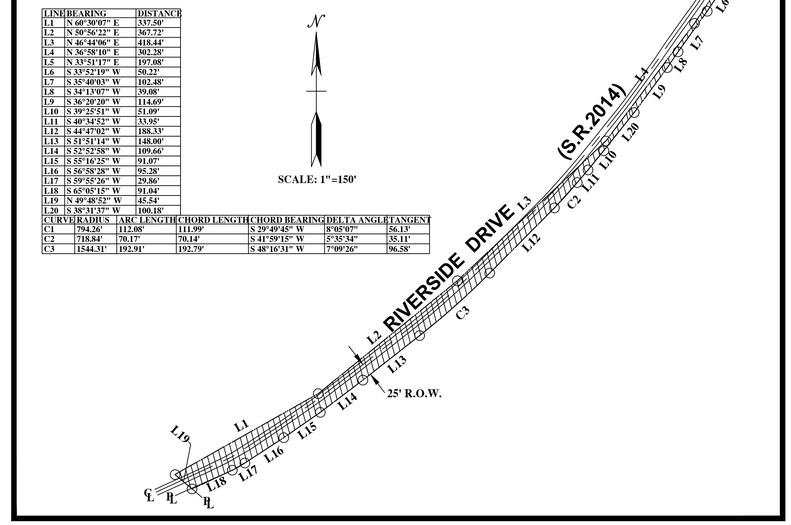
CURVE	RADIUS	ARC LENGTH	CHORD LENGTH	CHORD BEARING	DELTA ANGLE	TANGENT
C1	150.00'	187.73'	175.72'	S 70°31'16" E	71°42'30"	108.40'
C2	170.00'	212.76'	199.15'	N 70°31'16" W	71°42'30"	122.85'
C3	1630.00'	50.10'	50.10'	S 60°50'48" W	01°45'40"	25.05'



LINE	BEARING	DISTANCE
L01	S 83°17'15" W	2.09'
L02	S 83°17'15" W	20.00'
L03	N 06°42'45" W	20.00'
L04	N 83°17'15" E	20.00'
L05	S 06°42'45" E	20.00'

RNG WATER METER VAULT EASEMENT
AREA = 0.0092 AC.

RIVERSIDE DRIVE FUTURE RESERVED
R/W FOR DEED BOOK 830, PAGE 479
AREA = 0.533 ACRES



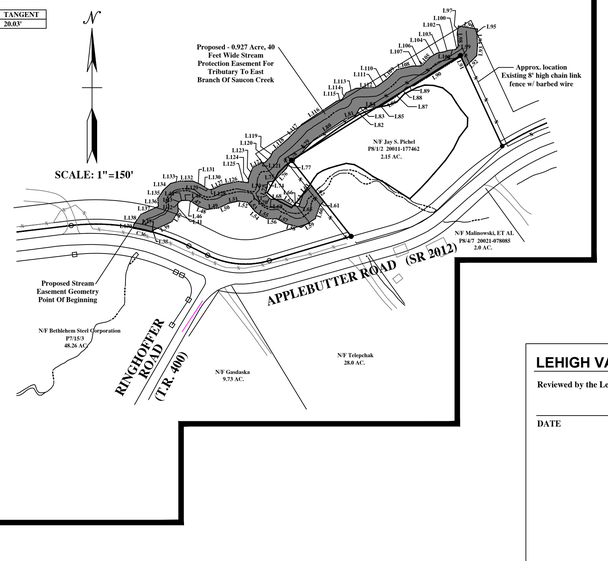
LINE	BEARING	DISTANCE
L1	N 60°30'07" E	337.50'
L2	N 50°56'22" E	367.72'
L3	N 46°44'06" E	418.44'
L4	N 36°58'10" E	302.28'
L5	N 33°51'17" E	197.08'
L6	S 33°52'19" W	50.22'
L7	S 35°40'03" W	102.48'
L8	S 34°13'07" W	39.08'
L9	S 36°20'20" W	114.69'
L10	S 39°25'51" W	51.09'
L11	S 40°34'52" W	33.95'
L12	S 44°47'02" W	188.33'
L13	S 51°51'14" W	148.00'
L14	S 52°52'58" W	109.66'
L15	S 58°16'25" W	91.07'
L16	S 56°58'28" W	95.28'
L17	S 59°55'26" W	29.86'
L18	S 65°05'15" W	91.04'
L19	N 49°48'52" W	45.54'
L20	S 38°31'37" W	100.18'

CURVE	RADIUS	ARC LENGTH	CHORD LENGTH	CHORD BEARING	DELTA ANGLE	TANGENT
C1	794.26'	112.08'	111.99'	S 29°49'45" W	8°05'07"	56.13'
C2	718.84'	70.17'	70.14'	S 41°59'15" W	5°35'34"	35.11'
C3	1544.31'	192.91'	192.79'	S 48°16'31" W	7°09'26"	96.58'

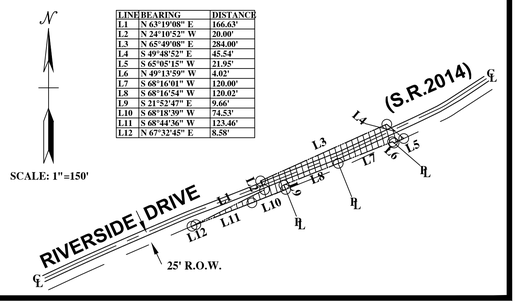
STREAM EASEMENT TABLE (GEOMETRY RUNS COUNTER-CLOCKWISE)
AREA = 0.927 AC.

CURVE	RADIUS	ARC LENGTH	CHORD LEN	CHORD BEARING	DELTA ANGLE	TANGENT
C36	430.00'	40.04'	40.03'	S 77°14'50" E	05°20'06"	20.03'

LINE	BEARING	DISTANCE
L37	N 10°31'01" E	0.83'
L38	N 35°29'00" E	5.77'
L39	N 65°49'57" E	40.17'
L40	N 32°08'37" E	25.05'
L41	N 04°58'23" W	15.82'
L42	N 34°14'35" E	2.39'
L43	N 47°27'57" E	5.43'
L44	N 75°58'39" E	5.00'
L45	S 89°25'19" E	12.33'
L46	S 65°40'40" E	6.86'
L47	S 50°54'56" E	16.55'
L48	S 69°27'48" E	18.66'
L49	N 82°52'56" E	23.70'
L50	N 64°33'50" E	23.31'
L51	N 78°32'31" E	21.22'
L52	S 81°40'48" E	17.59'
L53	S 40°00'00" E	23.89'
L54	S 51°10'31" E	13.20'
L55	S 64°27'46" E	16.76'
L56	N 89°40'42" E	19.82'
L57	S 60°35'12" E	19.78'
L58	S 76°05'49" E	33.58'
L59	N 58°20'24" E	33.82'
L60	N 19°25'52" E	29.11'
L61	N 43°56'54" E	11.53'
L62	N 38°03'15" W	40.39'
L63	S 43°56'54" W	25.84'
L64	S 19°25'52" W	23.67'
L65	S 58°20'24" W	2.89'
L66	N 76°05'49" W	11.33'
L67	N 60°35'12" W	24.95'
L68	S 89°40'42" W	21.25'
L69	N 64°27'46" W	2.91'
L70	N 51°10'31" W	4.63'
L71	N 40°00'00" W	9.88'
L72	N 15°50'20" E	13.80'
L73	N 06°35'19" E	10.38'
L74	N 21°49'18" E	0.40'
L75	N 84°55'32" E	11.73'
L76	N 44°34'49" E	36.75'
L77	N 26°35'19" E	10.79'
L78	N 49°45'31" E	34.02'
L79	N 43°30'17" E	39.48'
L80	N 56°28'58" E	75.83'
L81	N 72°31'44" E	21.82'
L82	N 29°23'31" E	18.01'
L83	N 65°39'35" E	2.33'
L84	N 87°23'07" E	38.65'
L85	N 63°44'38" E	3.76'
L86	N 58°11'45" E	32.51'
L87	N 53°14'51" E	13.99'
L88	N 45°48'51" E	18.22'
L89	N 77°19'12" E	15.61'
L90	N 58°11'45" E	113.58'
L91	S 24°48'15" E	23.03'
L92	N 45°01'46" E	31.32'
L93	N 04°55'56" E	21.50'
L94	N 03°34'48" W	23.72'
L95	N 09°25'00" E	9.80'
L96	N 80°35'00" W	40.00'
L97	S 09°25'00" W	14.35'
L98	S 03°34'48" E	25.30'
L99	S 04°55'56" W	3.93'
L100	S 45°01'46" W	7.19'
L101	S 83°51'35" W	12.67'
L102	S 72°54'50" W	12.68'
L103	S 79°23'27" W	12.97'
L104	S 59°57'25" W	15.83'
L105	S 44°00'24" W	23.45'
L106	S 67°05'20" W	4.21'
L107	N 90°00'00" W	16.76'
L108	S 77°19'12" W	32.74'
L109	S 45°48'51" W	26.91'
L110	S 53°14'51" W	24.97'
L111	S 63°44'38" W	7.10'
L112	S 87°23'07" W	37.96'
L113	S 65°39'35" W	23.11'
L114	S 29°23'21" W	15.30'
L115	S 72°31'44" W	11.65'
L116	S 56°28'58" W	86.02'
L117	S 43°30'17" W	41.84'
L118	S 49°45'31" W	40.04'
L119	S 26°35'19" W	12.66'
L120	S 44°34'49" W	15.72'
L121	S 84°55'32" W	6.21'
L122	S 64°04'51" W	20.40'
L123	S 21°49'18" W	23.17'
L124	S 06°35'19" W	11.36'
L125	N 81°40'48" W	20.40'
L126	S 78°31'01" W	33.10'
L127	S 64°33'09" W	21.77'
L128	S 82°52'56" W	7.41'
L129	N 49°27'48" W	4.41'
L130	N 56°54'56" W	15.22'
L131	N 65°40'40" W	18.34'
L132	N 89°25'19" W	25.87'
L133	S 75°58'39" W	20.37'
L134	S 47°27'57" W	20.23'
L135	S 34°14'35" W	20.93'
L136	S 04°05'23" E	16.55'
L137	S 65°49'57" W	30.82'
L138	S 35°29'00" W	25.47'
L139	S 10°31'01" W	8.12'



RIVERSIDE DRIVE FUTURE RESERVED
R/W FOR DEED BOOK 871, PAGE 479
AREA = 0.26 ACRES



LINE	BEARING	DISTANCE
L1	N 63°19'08" E	166.63'
L2	N 24°10'52" W	20.00'
L3	N 65°49'08" E	284.00'
L4	S 49°48'52" E	45.54'
L5	S 65°05'15" W	21.95'
L6	N 49°13'59" W	4.02'
L7	S 68°16'01" W	120.00'
L8	S 68°16'54" W	120.02'
L9	S 21°52'47" E	9.66'
L10	S 68°18'39" W	74.53'
L11	S 68°44'36" W	123.46'
L12	N 67°32'45" E	8.58'

LEHIGH VALLEY PLANNING COMMISSION REVIEW

Reviewed by the Leigh Valley Planning Commission

DATE PLANNER

TOWNSHIP PLANNING COMMISSION RECOMENDATIONS

Recommended for approval by the Lower Saucon Township Planning Commission this

_____ day of _____ 20___.

CHAIRMAN SECRETARY

OWNER'S CERTIFICATION

COMMONWEALTH OF PENNSYLVANIA
COUNTY OF NORTHAMPTON

We, the undersigned, the owners of the property shown on this plan, being duly sworn according to law, depose and say that we are sole owners of this property in peaceful possession of the same and that no suits pending affecting the title of the same. We further depose and say that this plan was made at our direction and that we desire the same to be recorded.

(OWNER) PRINT _____

(OWNER) SIGNATURE _____

Sworn to and subscribed before me this

_____ day of _____ 20___.

_____
NOTARY PUBLIC

TOWNSHIP COUNCIL APPROVAL AND TOWNSHIP ENGINEER REVIEW

Approved by the Lower Saucon Township Council this

_____ day of _____ 20___.

SECRETARY COUNCIL PRESIDENT

Reviewed by:

_____
TOWNSHIP ENGINEER

This _____ day of _____ 20___. .

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL ENGINEER — JOSEPH W. CHIA, JR. — No. 067206E

NO.	REVISION	DATE
1	AS PER 09/17/20 HANOVER REV. LETTER	10/23/20

PROPERTY CORNERS & EASEMENT DESCRIPTIONS

LOWER SAUCON TWP. NORTHAMPTON CO.

PRELIMINARY / FINAL LAND DEVELOPMENT PLAN & SITE PLAN

Bethlehem Landfill Company

PENNSYLVANIA

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

DWN. BY: MSH/DB | CHK. BY: RMB | PROJ. NO. 1162.4 | DSN. BY: JM

CADD FILE: 1162.4–LDP–03.dwg

DATE: 08/10/20

SCALE: NTS

DRAWING NO.

3 of 17

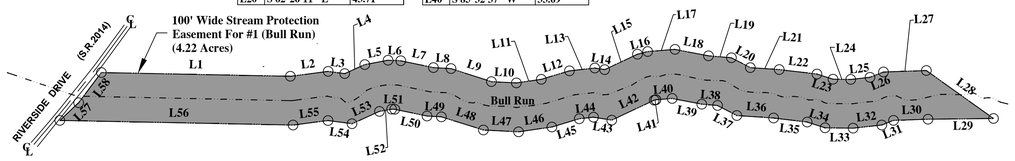
FILE: 1162.4 (NORTHERN EXPANSION) 1162.4–LDP–01.dwg

100' WIDE STREAM PROTECTION EASEMENT #1 (BULL RUN)
AREA = 4.22 ACRES

LINE	BEARING	DISTANCE
L1	S 88°51'47" E	387.91'
L2	N 82°39'05" E	78.12'
L3	S 82°24'43" E	34.28'
L4	N 65°48'25" E	45.20'
L5	N 79°27'41" E	48.62'
L6	S 87°38'27" E	26.07'
L7	S 78°10'47" E	68.41'
L8	S 86°49'13" E	36.15'
L9	S 72°05'33" E	87.09'
L10	S 87°00'24" E	51.26'
L11	N 81°45'12" E	51.78'
L12	N 73°14'26" E	60.29'
L13	N 83°41'15" E	52.41'
L14	S 80°46'15" E	20.48'
L15	N 64°49'14" E	74.37'
L16	N 75°12'03" E	21.61'
L17	N 85°32'37" E	56.19'
L18	S 79°08'07" E	70.03'
L19	S 85°10'51" E	47.26'
L20	S 62°26'11" E	43.71'

LINE	BEARING	DISTANCE
L21	S 86°08'29" E	59.51'
L22	S 83°15'28" E	77.94'
L23	S 72°08'23" E	34.62'
L24	S 89°17'58" E	36.34'
L25	N 83°45'28" E	39.78'
L26	N 68°28'45" E	29.76'
L27	N 88°02'24" E	88.06'
L28	S 54°26'24" E	169.31'
L29	S 89°22'12" W	134.32'
L30	S 88°02'24" W	70.82'
L31	S 68°28'45" W	25.93'
L32	S 83°45'28" W	59.26'
L33	N 89°17'58" W	57.50'
L34	N 72°08'23" W	38.54'
L35	N 83°07'42" W	69.46'
L36	N 86°08'29" W	75.60'
L37	N 62°26'11" W	44.58'
L38	N 85°10'51" W	32.43'
L39	N 79°08'07" W	61.86'
L40	S 85°32'37" W	33.69'

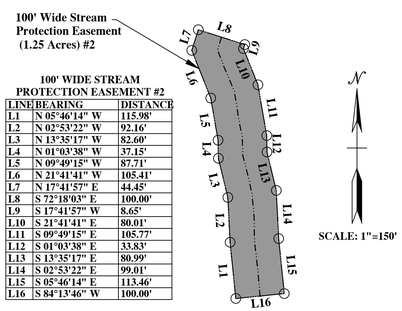
LINE	BEARING	DISTANCE
L41	S 75°12'03" W	3.48'
L42	S 64°49'14" W	96.25'
L43	N 80°46'15" W	37.79'
L44	S 83°41'15" W	29.62'
L45	S 73°14'26" W	58.59'
L46	S 81°45'12" W	69.06'
L47	N 87°00'24" W	72.26'
L48	N 72°36'51" W	90.36'
L49	N 86°49'13" W	29.50'
L50	N 78°10'47" W	67.69'
L51	N 87°38'27" W	6.50'
L52	S 79°27'41" W	25.35'
L53	S 65°48'25" W	61.70'
L54	N 82°24'43" W	49.64'
L55	S 82°39'05" W	72.43'
L56	N 88°51'47" W	478.64'
L57	N 46°44'06" E	53.08'
L58	N 36°58'00" E	77.53'



SCALE: 1"=150'

100' WIDE STREAM PROTECTION EASEMENT #2

LINE	BEARING	DISTANCE
L1	N 05°46'14" W	115.98'
L2	N 02°53'22" W	92.16'
L3	N 13°35'17" W	82.60'
L4	N 01°03'38" W	37.15'
L5	N 09°49'15" W	87.71'
L6	N 21°41'41" W	105.41'
L7	N 17°41'57" E	44.45'
L8	S 72°18'03" E	100.00'
L9	S 17°41'57" W	8.65'
L10	S 21°41'41" E	80.01'
L11	S 09°49'15" E	105.77'
L12	S 01°03'38" E	33.83'
L13	S 13°35'17" E	80.99'
L14	S 02°53'22" E	99.01'
L15	S 05°46'14" E	113.46'
L16	S 84°13'46" W	100.00'

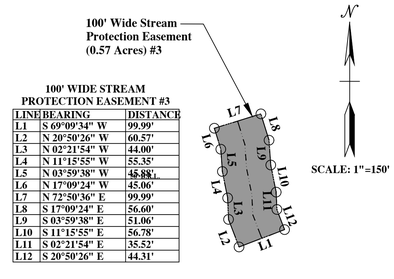


SCALE: 1"=150'

100' WIDE STREAM PROTECTION EASEMENT #2
AREA = 1.25 ACRES

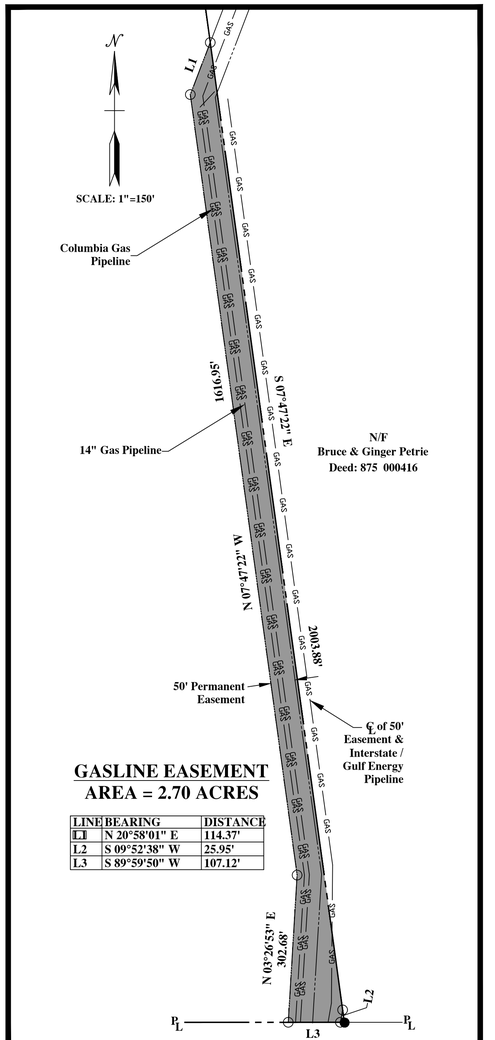
100' WIDE STREAM PROTECTION EASEMENT #3

LINE	BEARING	DISTANCE
L1	S 69°09'34" W	99.99'
L2	N 20°50'26" W	60.57'
L3	N 02°21'54" W	44.00'
L4	N 11°15'55" W	55.35'
L5	N 03°59'38" W	45.88'
L6	N 17°09'24" W	45.06'
L7	N 72°50'36" E	99.99'
L8	S 17°09'24" E	56.60'
L9	S 03°59'38" E	51.06'
L10	S 11°15'55" E	56.78'
L11	S 02°21'54" E	35.52'
L12	S 20°50'26" E	44.31'



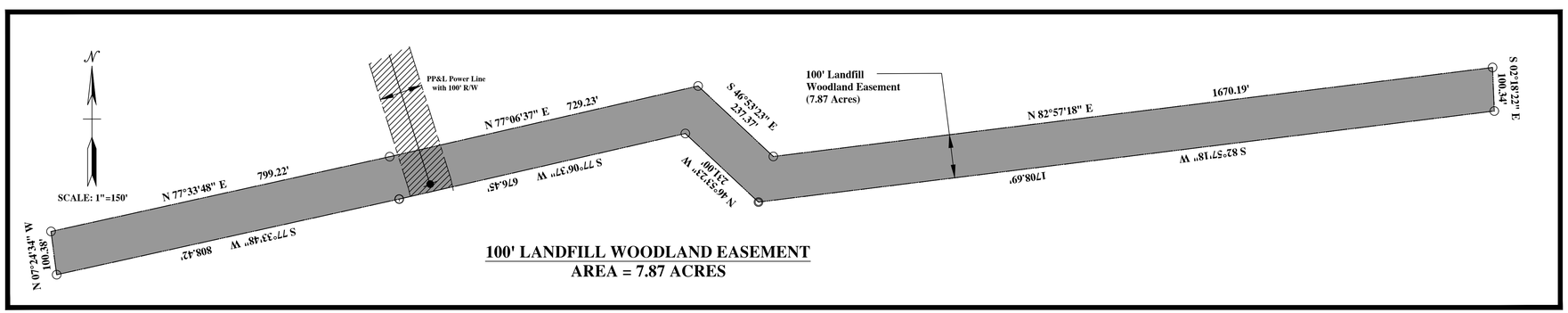
SCALE: 1"=150'

100' WIDE STREAM PROTECTION EASEMENT #3
AREA = 0.57 ACRES



GASLINE EASEMENT
AREA = 2.70 ACRES

LINE	BEARING	DISTANCE
L1	N 20°58'01" E	114.37'
L2	S 09°52'38" W	25.95'
L3	S 89°59'50" W	107.12'



100' LANDFILL WOODLAND EASEMENT
AREA = 7.87 ACRES

OWNER'S CERTIFICATION

COMMONWEALTH OF PENNSYLVANIA
COUNTY OF NORTHAMPTON

We, the undersigned, the owners of the property shown on this plan, being duly sworn according to law, depose and say that we are sole owners of this property in peaceful possession of the same and that no suits pending affecting the title of the same, We further depose and say that this plan was made at our direction and that we desire the same to be recorded.

(OWNER) PRINT _____

(OWNER) SIGNATURE _____

Sworn to and subscribed before me this

_____ day of _____ 20___.

_____
NOTARY PUBLIC

LEHIGH VALLEY PLANNING COMMISSION REVIEW

Reviewed by the Leigh Valley Planning Commission

_____ _____
DATE PLANNER

TOWNSHIP PLANNING COMMISSION RECOMENDATIONS

Recommended for approval by the Lower Saucon Township Planning Commission this

_____ day of _____ 20___.

_____ _____
CHAIRMAN SECRETARY

TOWNSHIP COUNCIL APPROVAL AND TOWNSHIP ENGINEER REVIEW

Approved by the Lower Saucon Township Council this

_____ day of _____ 20___.

_____ _____
SECRETARY COUNCIL PRESIDENT

Reviewed by:

_____
TOWNSHIP ENGINEER

This _____ day of _____ 20___. .

COMMONWEALTH OF PENNSYLVANIA — JOSEPH MICHAEL MARTIN — REGISTERED PROFESSIONAL ENGINEER

NO.	REVISION	DATE

PROPERTY CORNERS & EASEMENT DESCRIPTIONS

PRELIMINARY / FINAL LAND DEVELOPMENT PLAN & SITE PLAN

LOWER SAUCON TWP. NORTHAMPTON CO.

Bethlehem Landfill Company

PENNSYLVANIA

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

PROJ. NO.	DWG. BY:	CHK. BY:
1162.4	MSH/DB	RMB
DSN. BY:	JM	

CADD FILE: 1162.4-LDP-03A.dwg

DATE: 10/29/20

SCALE: NTS

DRAWING NO. **3A of 17**

FILE: 1162.4 (NORTHERN EXPANSION) 1162.4-LDP-03A.dwg

BENCHMARKS

	BENCHMARKS	COORDINATES	ELEVATION
BM-1	BENCH MARK PT.1 DRILL HOLE IN CHISEL CUT LMC-8	N 478,993.68 E 2,646,105.87	ELEV. 456.24
BM-2	BENCH MARK PT.2 DRILL HOLE IN CHISEL CUT LMC-7	N 479,153.22 E 2,646,622.26	ELEV. 471.28
BM-3	BENCH MARK PT.3 DRILL HOLE IN CHISEL CUT LMC-6	N 479,350.67 E 2,647,261.69	ELEV. 471.24
BM-4	BENCH MARK PT.4	N 479,422.66 E 2,647,595.57	ELEV. 480.29

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)
- ADJOINING PROPERTY LINE
- LANDFILL PROPERTY LINE (423.328 ACRE CONSOLIDATED LOT)
- DEP PERMIT BOUNDARY AS TAKEN FROM MARCH 1994 PERMIT DRAWINGS
- PP&L POWER LINE
- OVERHEAD UTILITY POLE
- EASEMENT LINE
- RIGHT OF WAY LINE
- FENCE
- WETLAND AREAS
- WOOD LINES, TREE MASSES
- 50' RIPARIAN CORRIDOR BUFFER
- SCENIC CONSERVATION EASEMENT
- STREAM PROTECTION EASEMENT
- LANDFILL WOODLAND EASEMENT
- WOODFILL AREA
- FLOODPLAIN AREA
- (2) ONSITE BUILDING DESIGNATION (SEE EXISTING BUILDING INVENTORY NOTE 4 THIS SHEET)
- STRUCTURE

NOTES:

1. MAPPING COMPILED BY PHOTOGRAMMETRIC METHODS FROM AERIAL PHOTOGRAPHY EXPOSED BY LAND MAPPING SERVICES, AND SOUTHEASTERN REALIGNMENT LAND DEVELOPMENT PLANS DATED SEPTEMBER 2017 BY MARTIN AND MARTIN, INC. AND BOUNDARY SURVEY PLANS BY KEYSTONE CONSULTING ENGINEERS, INC. FOR THE CITY OF BETHLEHEM DATED LAST REVISION JULY 1998.
2. DISPOSAL AREA INFORMATION TAKEN FROM SOUTHEASTERN REALIGNMENT LAND DEVELOPMENT PLANS PREPARED BY MARTIN AND MARTIN INC. DATED SEPTEMBER 2017. AND BOUNDARY SURVEY PLANS BY KEYSTONE CONSULTING ENGINEERS, INC. FOR THE CITY OF BETHLEHEM DATED LAST REVISION JULY 1998.
3. THE RIPARIAN CORRIDOR BUFFER AS ILLUSTRATED HEREON IS SUBJECT TO THE RESTRICTIONS OUTLINED IN SECTION 180-95 (F) OF THE LOWER SAUCON TOWNSHIP CODE. DELINEATION TAKEN FROM SOUTHEASTERN REALIGNMENT LAND DEVELOPMENT PLANS PREPARED BY MARTIN AND MARTIN, INC. DATED SEPTEMBER 2017 AND
4. EXISTING BUILDING INVENTORY
   1. OFFICE / SCALEHOUSE – (1 STORY ELEV.= 426.0, 1,624 SF, BUILT 2007. S.E. CORNER OF BLDG CORDINATES N 478,739, E 2,645,921)
   2. TRUCKWASH – (1 STORY ELEV.= 426.0, 864 SF, BUILT 2003. S.E. CORNER OF BLDG. CORDINATES N 478,741, E 2,645,707)
   3. MAINTENANCE BUILDING – (1 STORY ELEV.= 627.0, 6,165 SF, BUILT 2005. S.E. CORNER OF BLDG. CORDINATES N 480,531, E 2,646,187)
   4. GAS PLANT – (1 STORY ELEV.= 416.0, 2117 SF, BUILT 2009. S.E. CORNER OF BLDG. CORDINATES N 478,614, E 2,645,725)
   5. RNG GAS FACILITY – 1 STORY FF. ELEV. 451.00, APPROVED BUT NOT CONSTRUCTED.
5. EXISTING DEP PERMIT LIMIT FOLLOWS THE PROPERTY LINE UNLESS OTHERWISE SHOWN.
6. THE AGE OF WOODLANDS AND TREE ROWS WITHIN THE PROPERTY ARE LESS THAN 50 YEARS.
7. EXISTING IMPERVIOUS AREA (ROADWAYS/BUILDINGS) WITHIN LANDFILL PROPERTY IS 13.00 ACRES.

NO.	REVISION	DATE
1	AS PER 09/17/20 HANOVER REV. LETTER	10/23/20

OVERALL EXISTING CONDITIONS

PRELIMINARY / FINAL LAND DEVELOPMENT PLAN & SITE PLAN

Bethlehem Landfill Company

NORTHAMPTON CO.

LOWER SAUCON TWP.

PENNSYLVANIA

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

PROJ. NO.: 1162.4 | DSN. BY: JM | DWN. BY: DB | CHK. BY: RMB | SCALE: 300' 150' 0 300' 600' Scale: 1" = 300'

CADD FILE: 1162.4-LDP-04.dwg

DATE: 08/10/20

SCALE: 1" = 300'

DRAWING NO.

4 of 17

FILE: 1162.4 (NORTHERN EXPANSION) 1162.4-LDP-04.dwg

GEOLOGY

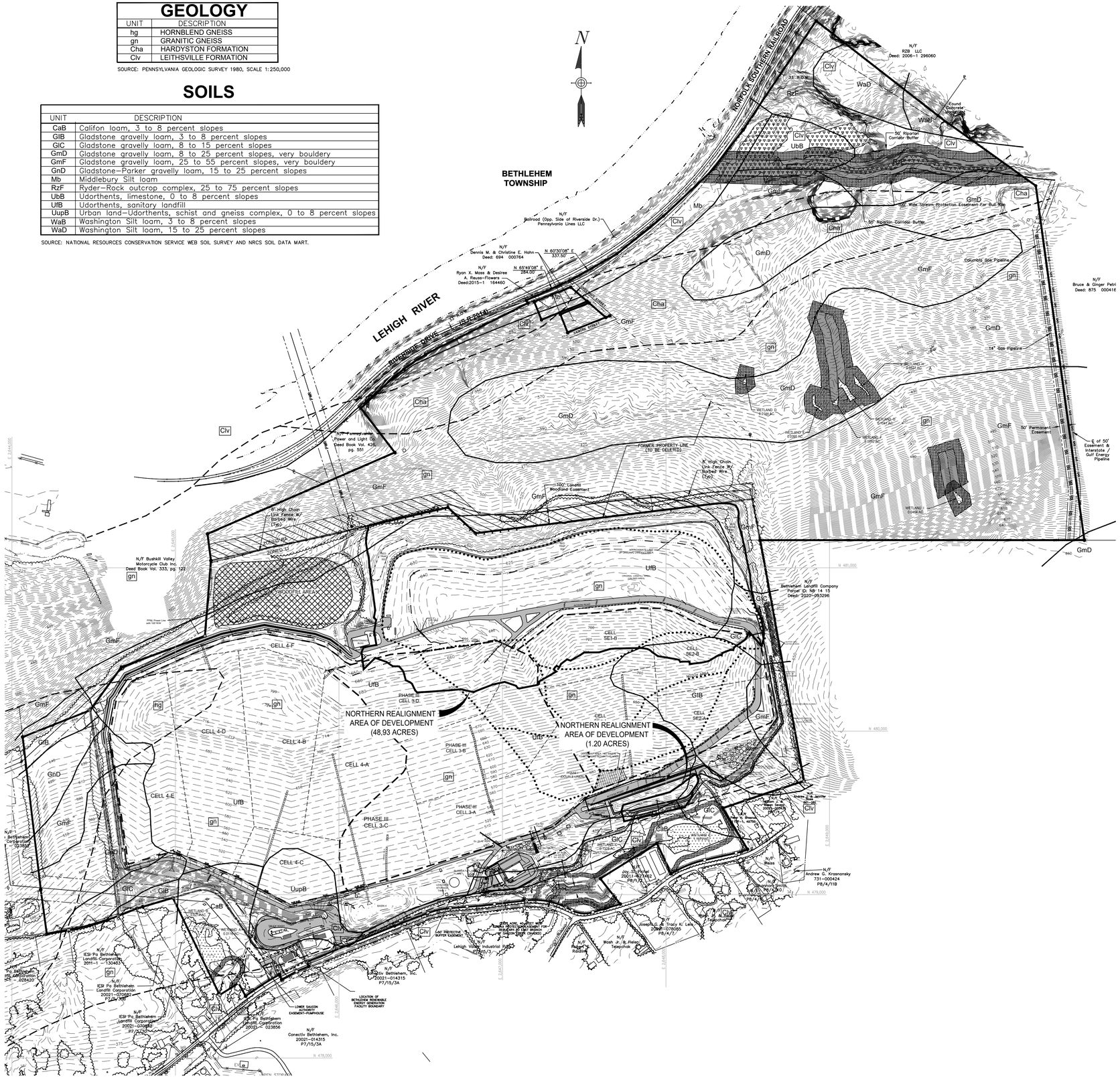
UNIT	DESCRIPTION
hg	HORNBLEND GNEISS
gn	GRANITIC GNEISS
Cha	HARDYSTON FORMATION
Clv	LEITHSVILLE FORMATION

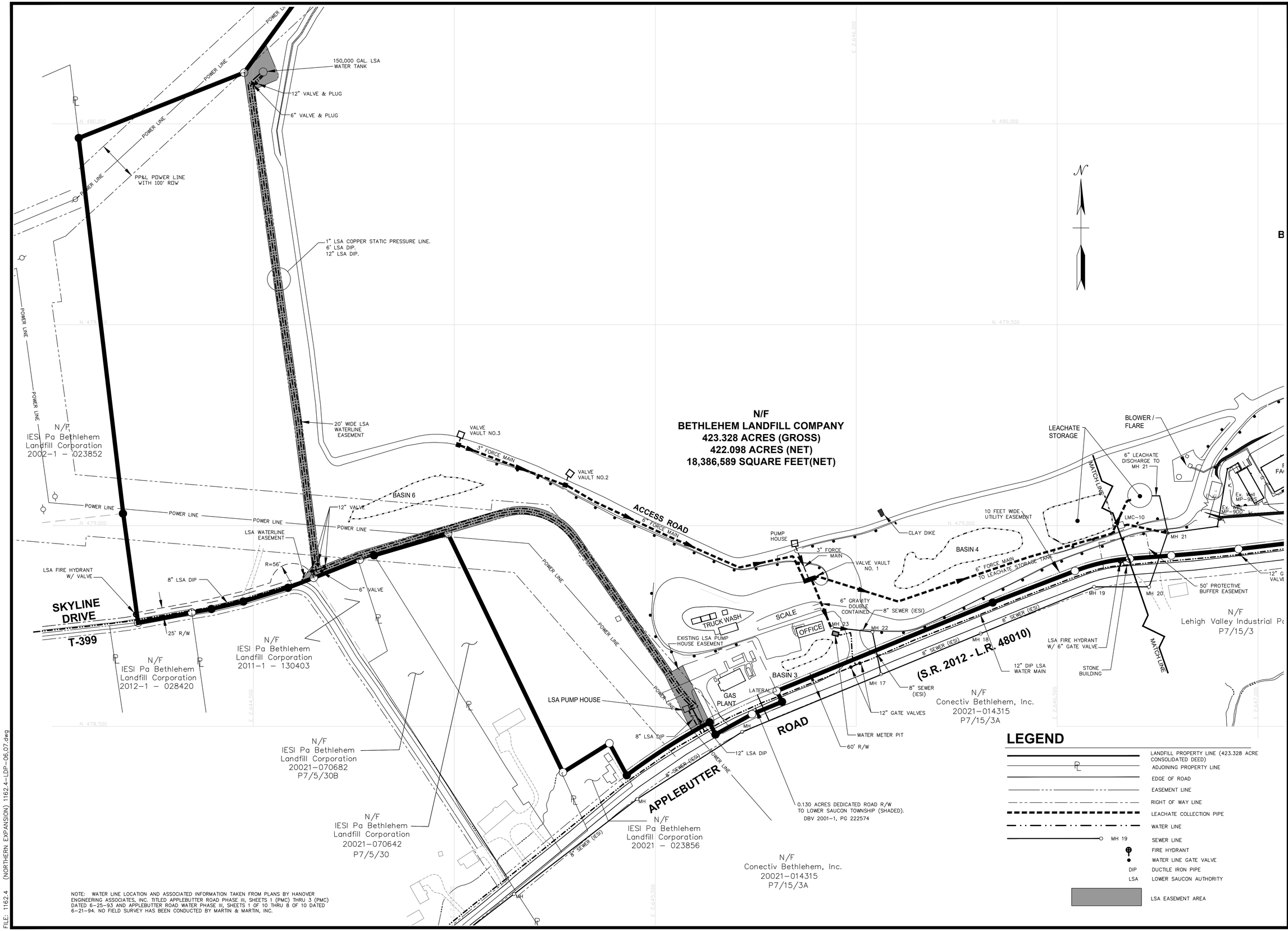
SOURCE: PENNSYLVANIA GEOLOGIC SURVEY 1980, SCALE 1:250,000

SOILS

UNIT	DESCRIPTION
CaB	Califon loam, 3 to 8 percent slopes
GlB	Gladstone gravelly loam, 3 to 8 percent slopes
GlC	Gladstone gravelly loam, 8 to 15 percent slopes
GmD	Gladstone gravelly loam, 8 to 25 percent slopes, very bouldery
GmF	Gladstone gravelly loam, 25 to 55 percent slopes, very bouldery
GnD	Gladstone–Parker gravelly loam, 15 to 25 percent slopes
Mb	Middlebury Silt loam
RzF	Ryder–Rock outcrop complex, 25 to 75 percent slopes
UbB	Udorthents, limestone, 0 to 8 percent slopes
UfB	Udorthents, sanitary landfill
UupB	Urban land–Udorthents, schist and gneiss complex, 0 to 8 percent slopes
WaB	Washington Silt loam, 3 to 8 percent slopes
WaD	Washington Silt loam, 15 to 25 percent slopes

SOURCE: NATIONAL RESOURCES CONSERVATION SERVICE WEB SOIL SURVEY AND NRCS SOIL DATA MART.


N
BETHLEHEM TOWNSHIP
LEHIGH RIVER
RIVERSIDE DRIVE
NORFOLK SOUTHERN RAILROAD
N/F RZB LLC Deed: 2006-1 296060
N/F Railroad (Opp. Side of Riverside Dr.) Pennsylvania Lines LLC
N/F Dennis M. & Christina E. Hohn Deed: 694 000764
N/F Ryan X. Moss & Desiree A. Reuss-Flowers Deed:2015-1 164460
N/F Bruce & Ginger Petri Deed: 875 00041
N/F Bushkill Valley Motorcycle Club Inc. Deed Book Vol. 333, pg. 122
N/F Bethlehem Landfill Company Parcel ID: N9 14 15 Deed: 2007-093296
N/F Power and Light Co. Deed Book Vol. 426, pg. 551
FORMER PROPERTY LINE (TO BE DELETED)
NORTHERN REALIGNMENT AREA OF DEVELOPMENT (48.93 ACRES)
NORTHERN REALIGNMENT AREA OF DEVELOPMENT (1.20 ACRES)
PHASE II CELL 5-D
PHASE III CELL 4-F
PHASE III CELL 4-D
PHASE III CELL 4-B
PHASE III CELL 4-A
PHASE III CELL 3-C
PHASE III CELL 3-B
PHASE III CELL 3-A
CELL SE2-8
CELL SE2-A4
CELL SE1-8
CELL 4-C
CELL 4-E
50' Riparian Corridor Buffer
100' Wide Storm Protection Easement For Gut Run
Columbia Gas Pipeline
14" Gas Pipeline
50' Permanent Easement
E of 50' Easement & Interstate Gulf Energy Pipeline
100' Landfill Woodland Easement
8' High Chain Link Fence W/ Barbed Wire (Typ.)
WOODFILL AREA
WETLAND A 0.0161 AC.
WETLAND B 0.0161 AC.
WETLAND C 0.1647 AC.
WETLAND D 0.0161 AC.
WETLAND E 0.0161 AC.
WETLAND F 0.0161 AC.
WETLAND G 0.0161 AC.
WETLAND H 0.0161 AC.
WETLAND I 0.0161 AC.
WETLAND J 0.0161 AC.
WETLAND K 0.0161 AC.
WETLAND L 0.0161 AC.
WETLAND M 0.0161 AC.
WETLAND N 0.0161 AC.
WETLAND O 0.0161 AC.
WETLAND P 0.0161 AC.
WETLAND Q 0.0161 AC.
WETLAND R 0.0161 AC.
WETLAND S 0.0161 AC.
WETLAND T 0.0161 AC.
WETLAND U 0.0161 AC.
WETLAND V 0.0161 AC.
WETLAND W 0.0161 AC.
WETLAND X 0.0161 AC.
WETLAND Y 0.0161 AC.
WETLAND Z 0.0161 AC.
WETLAND AA 0.0161 AC.
WETLAND AB 0.0161 AC.
WETLAND AC 0.0161 AC.
WETLAND AD 0.0161 AC.
WETLAND AE 0.0161 AC.
WETLAND AF 0.0161 AC.
WETLAND AG 0.0161 AC.
WETLAND AH 0.0161 AC.
WETLAND AI 0.0161 AC.
WETLAND AJ 0.0161 AC.
WETLAND AK 0.0161 AC.
WETLAND AL 0.0161 AC.
WETLAND AM 0.0161 AC.
WETLAND AN 0.0161 AC.
WETLAND AO 0.0161 AC.
WETLAND AP 0.0161 AC.
WETLAND AQ 0.0161 AC.
WETLAND AR 0.0161 AC.
WETLAND AS 0.0161 AC.
WETLAND AT 0.0161 AC.
WETLAND AU 0.0161 AC.
WETLAND AV 0.0161 AC.
WETLAND AW 0.0161 AC.
WETLAND AX 0.0161 AC.
WETLAND AY 0.0161 AC.
WETLAND AZ 0.0161 AC.
WETLAND BA 0.0161 AC.
WETLAND BB 0.0161 AC.
WETLAND BC 0.0161 AC.
WETLAND BD 0.0161 AC.
WETLAND BE 0.0161 AC.
WETLAND BF 0.0161 AC.
WETLAND BG 0.0161 AC.
WETLAND BH 0.0161 AC.
WETLAND BI 0.0161 AC.
WETLAND BJ 0.0161 AC.
WETLAND BK 0.0161 AC.
WETLAND BL 0.0161 AC.
WETLAND BM 0.0161 AC.
WETLAND BN 0.0161 AC.
WETLAND BO 0.0161 AC.
WETLAND BP 0.0161 AC.
WETLAND BQ 0.0161 AC.
WETLAND BR 0.0161 AC.
WETLAND BS 0.0161 AC.
WETLAND BT 0.0161 AC.
WETLAND BU 0.0161 AC.
WETLAND BV 0.0161 AC.
WETLAND BW 0.0161 AC.
WETLAND BX 0.0161 AC.
WETLAND BY 0.0161 AC.
WETLAND BZ 0.0161 AC.
WETLAND CA 0.0161 AC.
WETLAND CB 0.0161 AC.
WETLAND CC 0.0161 AC.
WETLAND CD 0.0161 AC.
WETLAND CE 0.0161 AC.
WETLAND CF 0.0161 AC.
WETLAND CG 0.0161 AC.
WETLAND CH 0.0161 AC.
WETLAND CI 0.0161 AC.
WETLAND CJ 0.0161 AC.
WETLAND CK 0.0161 AC.
WETLAND CL 0.0161 AC.
WETLAND CM 0.0161 AC.
WETLAND CN 0.0161 AC.
WETLAND CO 0.0161 AC.
WETLAND CP 0.0161 AC.
WETLAND CQ 0.0161 AC.
WETLAND CR 0.0161 AC.
WETLAND CS 0.0161 AC.
WETLAND CT 0.0161 AC.
WETLAND CU 0.0161 AC.
WETLAND CV 0.0161 AC.
WETLAND CW 0.0161 AC.
WETLAND CX 0.0161 AC.
WETLAND CY 0.0161 AC.
WETLAND CZ 0.0161 AC.
WETLAND DA 0.0161 AC.
WETLAND DB 0.0161 AC.
WETLAND DC 0.0161 AC.
WETLAND DD 0.0161 AC.
WETLAND DE 0.0161 AC.
WETLAND DF 0.0161 AC.
WETLAND DG 0.0161 AC.
WETLAND DH 0.0161 AC.
WETLAND DI 0.0161 AC.
WETLAND DJ 0.0161 AC.
WETLAND DK 0.0161 AC.
WETLAND DL 0.0161 AC.
WETLAND DM 0.0161 AC.
WETLAND DN 0.0161 AC.
WETLAND DO 0.0161 AC.
WETLAND DP 0.0161 AC.
WETLAND DQ 0.0161 AC.
WETLAND DR 0.0161 AC.
WETLAND DS 0.0161 AC.
WETLAND DT 0.0161 AC.
WETLAND DU 0.0161 AC.
WETLAND DV 0.0161 AC.
WETLAND DW 0.0161 AC.
WETLAND DX 0.0161 AC.
WETLAND DY 0.0161 AC.
WETLAND DZ 0.0161 AC.
WETLAND EA 0.0161 AC.
WETLAND EB 0.0161 AC.
WETLAND EC 0.0161 AC.
WETLAND ED 0.0161 AC.
WETLAND EE 0.0161 AC.
WETLAND EF 0.0161 AC.
WETLAND EG 0.0161 AC.
WETLAND EH 0.0161 AC.
WETLAND EI 0.0161 AC.
WETLAND EJ 0.0161 AC.
WETLAND EK 0.0161 AC.
WETLAND EL 0.0161 AC.
WETLAND EM 0.0161 AC.
WETLAND EN 0.0161 AC.
WETLAND EO 0.0161 AC.
WETLAND EP 0.0161 AC.
WETLAND EQ 0.0161 AC.
WETLAND ER 0.0161 AC.
WETLAND ES 0.0161 AC.
WETLAND ET 0.0161 AC.
WETLAND EU 0.0161 AC.
WETLAND EV 0.0161 AC.
WETLAND EW 0.0161 AC.
WETLAND EX 0.0161 AC.
WETLAND EY 0.0161 AC.
WETLAND EZ 0.0161 AC.
WETLAND FA 0.0161 AC.
WETLAND FB 0.0161 AC.
WETLAND FC 0.0161 AC.
WETLAND FD 0.0161 AC.
WETLAND FE 0.0161 AC.
WETLAND FF 0.0161 AC.
WETLAND FG 0.0161 AC.
WETLAND FH 0.0161 AC.
WETLAND FI 0.0161 AC.
WETLAND FJ 0.0161 AC.
WETLAND FK 0.0161 AC.
WETLAND FL 0.0161 AC.
WETLAND FM 0.0161 AC.
WETLAND FN 0.0161 AC.
WETLAND FO 0.0161 AC.
WETLAND FP 0.0161 AC.
WETLAND FQ 0.0161 AC.
WETLAND FR 0.0161 AC.
WETLAND FS 0.0161 AC.
WETLAND FT 0.0161 AC.
WETLAND FU 0.0161 AC.
WETLAND FV 0.0161 AC.
WETLAND FW 0.0161 AC.
WETLAND FX 0.0161 AC.
WETLAND FY 0.0161 AC.
WETLAND FZ 0.0161 AC.
WETLAND GA 0.0161 AC.
WETLAND GB 0.0161 AC.
WETLAND GC 0.0161 AC.
WETLAND GD 0.0161 AC.
WETLAND GE 0.0161 AC.
WETLAND GF 0.0161 AC.
WETLAND GG 0.0161 AC.
WETLAND GH 0.0161 AC.
WETLAND GI 0.0161 AC.
WETLAND GJ 0.0161 AC.
WETLAND GK 0.0161 AC.
WETLAND GL 0.0161 AC.
WETLAND GM 0.0161 AC.
WETLAND GN 0.0161 AC.
WETLAND GO 0.0161 AC.
WETLAND GP 0.0161 AC.
WETLAND GQ 0.0161 AC.
WETLAND GR 0.0161 AC.
WETLAND GS 0.0161 AC.
WETLAND GT 0.0161 AC.
WETLAND GU 0.0161 AC.
WETLAND GV 0.0161 AC.
WETLAND GW 0.0161 AC.
WETLAND GX 0.0161 AC.
WETLAND GY 0.0161 AC.
WETLAND GZ 0.0161 AC.
WETLAND HA 0.0161 AC.
WETLAND HB 0.0161 AC.
WETLAND HC 0.0161 AC.
WETLAND HD 0.0161 AC.
WETLAND HE 0.0161 AC.
WETLAND HF 0.0161 AC.
WETLAND HG 0.0161 AC.
WETLAND HH 0.0161 AC.
WETLAND HI 0.0161 AC.
WETLAND HJ 0.0161 AC.
WETLAND HK 0.0161 AC.
WETLAND HL 0.0161 AC.
WETLAND HM 0.0161 AC.
WETLAND HN 0.0161 AC.
WETLAND HO 0.0161 AC.
WETLAND HP 0.0161 AC.
WETLAND HQ 0.0161 AC.
WETLAND HR 0.0161 AC.
WETLAND HS 0.0161 AC.
WETLAND HT 0.0161 AC.
WETLAND HU 0.0161 AC.
WETLAND HV 0.0161 AC.
WETLAND HW 0.0161 AC.
WETLAND HX 0.0161 AC.
WETLAND HY 0.0161 AC.
WETLAND HZ 0.0161 AC.
WETLAND IA 0.0161 AC.
WETLAND IB 0.0161 AC.
WETLAND IC 0.0161 AC.
WETLAND ID 0.0161 AC.
WETLAND IE 0.0161 AC.
WETLAND IF 0.0161 AC.
WETLAND IG 0.0161 AC.
WETLAND IH 0.0161 AC.
WETLAND II 0.0161 AC.
WETLAND IJ 0.0161 AC.
WETLAND IK 0.0161 AC.
WETLAND IL 0.0161 AC.
WETLAND IM 0.0161 AC.
WETLAND IN 0.0161 AC.
WETLAND IO 0.0161 AC.
WETLAND IP 0.0161 AC.
WETLAND IQ 0.0161 AC.
WETLAND IR 0.0161 AC.
WETLAND IS 0.0161 AC.
WETLAND IT 0.0161 AC.
WETLAND IU 0.0161 AC.
WETLAND IV 0.0161 AC.
WETLAND IW 0.0161 AC.
WETLAND IX 0.0161 AC.
WETLAND IY 0.0161 AC.
WETLAND IZ 0.0161 AC.
WETLAND JA 0.0161 AC.
WETLAND JB 0.0161 AC.
WETLAND JC 0.0161 AC.
WETLAND JD 0.0161 AC.
WETLAND JE 0.0161 AC.
WETLAND JF 0.0161 AC.
WETLAND JG 0.0161 AC.
WETLAND JH 0.0161 AC.
WETLAND JI 0.0161 AC.
WETLAND JJ 0.0161 AC.
WETLAND JK 0.0161 AC.
WETLAND JL 0.0161 AC.
WETLAND JM 0.0161 AC.
WETLAND JN 0.0161 AC.
WETLAND JO 0.0161 AC.
WETLAND JP 0.0161 AC.
WETLAND JQ 0.0161 AC.
WETLAND JR 0.0161 AC.
WETLAND JS 0.0161 AC.
WETLAND JT 0.0161 AC.
WETLAND JU 0.0161 AC.
WETLAND JV 0.0161 AC.
WETLAND JW 0.0161 AC.
WETLAND JX 0.0161 AC.
WETLAND JY 0.0161 AC.
WETLAND JZ 0.0161 AC.
WETLAND KA 0.0161 AC.
WETLAND KB 0.0161 AC.
WETLAND KC 0.0161 AC.
WETLAND KD 0.0161 AC.
WETLAND KE 0.0161 AC.
WETLAND KF 0.0161 AC.
WETLAND KG 0.0161 AC.
WETLAND KH 0.0161 AC.
WETLAND KI 0.0161 AC.
WETLAND KJ 0.0161 AC.
WETLAND KK 0.0161 AC.
WETLAND KL 0.0161 AC.
WETLAND KM 0.0161 AC.
WETLAND KN 0.0161 AC.
WETLAND KO 0.0161 AC.
WETLAND KP 0.0161 AC.
WETLAND KQ 0.0161 AC.
WETLAND KR 0.0161 AC.
WETLAND KS 0.0161 AC.
WETLAND KT 0.0161 AC.
WETLAND KU 0.0161 AC.
WETLAND KV 0.0161 AC.
WETLAND KW 0.0161 AC.
WETLAND KX 0.0161 AC.
WETLAND KY 0.0161 AC.
WETLAND KZ 0.0161 AC.
WETLAND LA 0.0161 AC.
WETLAND LB 0.0161 AC.
WETLAND LC 0.0161 AC.
WETLAND LD 0.0161 AC.
WETLAND LE 0.0161 AC.
WETLAND LF 0.0161 AC.
WETLAND LG 0.0161 AC.
WETLAND LH 0.0161 AC.
WETLAND LI 0.0161 AC.
WETLAND LJ 0.0161 AC.
WETLAND LK 0.0161 AC.
WETLAND LL 0.0161 AC.
WETLAND LM 0.0161 AC.
WETLAND LN 0.0161 AC.
WETLAND LO 0.0161 AC.
WETLAND LP 0.0161 AC.
WETLAND LQ 0.0161 AC.
WETLAND LR 0.0161 AC.
WETLAND LS 0.0161 AC.
WETLAND LT 0.0161 AC.
WETLAND LU 0.0161 AC.
WETLAND LV 0.0161 AC.
WETLAND LW 0.0161 AC.
WETLAND LX 0.0161 AC.
WETLAND LY 0.0161 AC.
WETLAND LZ 0.0161 AC.
WETLAND MA 0.0161 AC.
WETLAND MB 0.0161 AC.
WETLAND MC 0.0161 AC.
WETLAND MD 0.0161 AC.
WETLAND ME 0.0161 AC.
WETLAND MF 0.0161 AC.
WETLAND MG 0.0161 AC.
WETLAND MH 0.0161 AC.
WETLAND MI 0.0161 AC.
WETLAND MJ 0.0161 AC.
WETLAND MK 0.0161 AC.
WETLAND ML 0.0161 AC.
WETLAND MM 0.0161 AC.
WETLAND MN 0.0161 AC.
WETLAND MO 0.0161 AC.
WETLAND MP 0.0161 AC.
WETLAND MQ 0.0161 AC.
WETLAND MR 0.0161 AC.
WETLAND MS 0.0161 AC.
WETLAND MT 0.0161 AC.
WETLAND MU 0.0161 AC.
WETLAND MV 0.0161 AC.
WETLAND MW 0.0161 AC.
WETLAND MX 0.0161 AC.
WETLAND MY 0.0161 AC.
WETLAND MZ 0.0161 AC.
WETLAND NA 0.0161 AC.
WETLAND NB 0.0161 AC.
WETLAND NC 0.0161 AC.
WETLAND ND 0.0161 AC.
WETLAND NE 0.0161 AC.
WETLAND NF 0.0161 AC.
WETLAND NG 0.0161 AC.
WETLAND NH 0.0161 AC.
WETLAND NI 0.0161 AC.
WETLAND NJ 0.0161 AC.
WETLAND NK 0.0161 AC.
WETLAND NL 0.0161 AC.
WETLAND NM 0.0161 AC.
WETLAND NN 0.0161 AC.
WETLAND NO 0.0161 AC.
WETLAND NP 0.0161 AC.
WETLAND NQ 0.0161 AC.
WETLAND NR 0.0161 AC.
WETLAND NS 0.0161 AC.
WETLAND NT 0.0161 AC.
WETLAND NU 0.0161 AC.
WETLAND NV 0.0161 AC.
WETLAND NW 0.0161 AC.
WETLAND NX 0.0161 AC.
WETLAND NY 0.0161 AC.
WETLAND NZ 0.0161 AC.
WETLAND OA 0.0161 AC.
WETLAND OB 0.0161 AC.
WETLAND OC 0.0161 AC.
WETLAND OD 0.0161 AC.
WETLAND OE 0.0161 AC.
WETLAND OF 0.0161 AC.
WETLAND OG 0.0161 AC.
WETLAND OH 0.0161 AC.
WETLAND OI 0.0161 AC.
WETLAND OJ 0.0161 AC.
WETLAND OK 0.0161 AC.
WETLAND OL 0.0161 AC.
WETLAND OM 0.0161 AC.
WETLAND ON 0.0161 AC.
WETLAND OO 0.0161 AC.
WETLAND OP 0.0161 AC.
WETLAND OQ 0.0161 AC.
WETLAND OR 0.0161 AC.
WETLAND OS 0.0161 AC.
WETLAND OT 0.0161 AC.
WETLAND OU 0.0161 AC.
WETLAND OV 0.0161 AC.
WETLAND OW 0.0161 AC.
WETLAND OX 0.0161 AC.
WETLAND OY 0.0161 AC.
WETLAND OZ 0.0161 AC.
WETLAND PA 0.0161 AC.
WETLAND PB 0.0161 AC.
WETLAND PC 0.0161 AC.
WETLAND PD 0.0161 AC.
WETLAND PE 0.0161 AC.
WETLAND PF 0.0161 AC.
WETLAND PG 0.0161 AC.
WETLAND PH 0.0161 AC.
WETLAND PI 0.0161 AC.
WETLAND PJ 0.0161 AC.
WETLAND PK 0.0161 AC.
WETLAND PL 0.0161 AC.
WETLAND PM 0.0161 AC.
WETLAND PN 0.0161 AC.
WETLAND PO 0.0161 AC.
WETLAND PP 0.0161 AC.
WETLAND PQ 0.0161 AC.
WETLAND PR 0.0161 AC.
WETLAND PS 0.0161 AC.
WETLAND PT 0.0161 AC.
WETLAND PU 0.0161 AC.
WETLAND PV 0.0161 AC.
WETLAND PW 0.0161 AC.
WETLAND PX 0.0161 AC.
WETLAND PY 0.0161 AC.
WETLAND PZ 0.0161 AC.
WETLAND QA 0.0161 AC.
WETLAND QB 0.0161 AC.
WETLAND QC 0.0161 AC.
WETLAND QD 0.0161 AC.
WETLAND QE 0.0161 AC.
WETLAND QF 0.0161 AC.
WETLAND QG 0.0161 AC.
WETLAND QH 0.0161 AC.
WETLAND QI 0.0161 AC.
WETLAND QJ 0.0161 AC.
WETLAND QK 0.0161 AC.
WETLAND QL 0.0161 AC.
WETLAND QM 0.0161 AC.
WETLAND QN 0.0161 AC.
WETLAND QO 0.0161 AC.
WETLAND QP 0.0161 AC.
WETLAND QQ 0.0161 AC.
WETLAND QR 0.0161 AC.
WETLAND QS 0.0161 AC.
WETLAND QT 0.0161 AC.
WETLAND QU 0.0161 AC.
WETLAND QV 0.0161 AC.
WETLAND QW 0.0161 AC.
WETLAND QX 0.0161 AC.
WETLAND QY 0.0161 AC.
WETLAND QZ 0.0161 AC.
WETLAND RA 0.0161 AC.
WETLAND RB 0.0161 AC.
WETLAND RC 0.0161 AC.
WETLAND RD 0.0161 AC.
WETLAND RE 0.0161 AC.
WETLAND RF 0.0161 AC.
WETLAND RG 0.0161 AC.
WETLAND RH 0.0161 AC.
WETLAND RI 0.0161 AC.
WETLAND RJ 0.0161 AC.
WETLAND RK 0.0161 AC.
WETLAND RL 0.0161 AC.
WETLAND RM 0.0161 AC.
WETLAND RN 0.0161 AC.
WETLAND RO 0.0161 AC.
WETLAND RP 0.0161 AC.
WETLAND RQ 0.0161 AC.
WETLAND RR 0.0161 AC.
WETLAND RS 0.0161 AC.
WETLAND RT 0.0161 AC.
WETLAND RU 0.0161 AC.
WETLAND RV 0.0161 AC.
WETLAND RW 0.0161 AC.
WETLAND RX 0.0161 AC.
WETLAND RY 0.0161 AC.
WETLAND RZ 0.0161 AC.
WETLAND SA 0.0161 AC.
WETLAND SB 0.0161 AC.
WETLAND SC 0.0161 AC.
WETLAND SD 0.0161 AC.
WETLAND SE 0.0161 AC.
WETLAND SF 0.0161 AC.
WETLAND SG 0.0161 AC.
WETLAND SH 0.0161 AC.
WETLAND SI 0.0161 AC.
WETLAND SJ 0.0161 AC.
WETLAND SK 0.0161 AC.
WETLAND SL 0.0161 AC.
WETLAND SM 0.0161 AC.
WETLAND SN 0.0161 AC.
WETLAND SO 0.0161 AC.
WETLAND SP 0.0161 AC.
WETLAND SQ 0.0161 AC.
WETLAND SR 0.0161 AC.
WETLAND SS 0.0161 AC.
WETLAND ST 0.0161 AC.
WETLAND SU 0.0161 AC.
WETLAND SV 0.0161 AC.
WETLAND SW 0.0161 AC.
WETLAND SX 0.0161 AC.
WETLAND SY 0.0161 AC.
WETLAND SZ 0.0161 AC.
WETLAND TA 0.0161 AC.
WETLAND TB 0.0161 AC.
WETLAND TC 0.0161 AC.
WETLAND TD 0.0161 AC.
WETLAND TE 0.0161 AC.
WETLAND TF 0.0161 AC.
WETLAND TG 0.0161 AC.
WETLAND TH 0.0161 AC.
WETLAND TI 0.0161 AC.
WETLAND TJ 0.0161 AC.
WETLAND TK 0.0161 AC.
WETLAND TL 0.0161 AC.
WETLAND TM 0.0161 AC.
WETLAND TN 0.0161 AC.
WETLAND TO 0.0161 AC.
WETLAND TP 0.0161 AC.
WETLAND TQ 0.0161 AC.
WETLAND TR 0.0161 AC.
WETLAND TS 0.0161 AC.
WETLAND TT 0.0161 AC.
WETLAND TU 0.0161 AC.
WETLAND TV 0.0161 AC.
WETLAND TW 0.0161 AC.
WETLAND TX 0.0161 AC.
WETLAND TY 0.0161 AC.
WETLAND TZ 0.0161 AC.
WETLAND UA 0.0161 AC.
WETLAND UB 0.0161 AC.
WETLAND UC 0.0161 AC.
WETLAND UD 0.0161 AC.
WETLAND UE 0.0161 AC.
WETLAND UF 0.0161 AC.
WETLAND UG 0.0161 AC.
WETLAND UH 0.0161 AC.
WETLAND UI 0.0161 AC.
WETLAND UJ 0.0161 AC.
WETLAND UK 0.0161 AC.
WETLAND UL 0.0161 AC.
WETLAND UM 0.0161 AC.
WETLAND UN 0.0161 AC.
WETLAND UO 0.0161 AC.
WETLAND UP 0.0161 AC.
WETLAND UQ 0.0161 AC.
WETLAND UR 0.0161 AC.
WETLAND US 0.0161 AC.
WETLAND UT 0.0161 AC.
WETLAND UU 0.0161 AC.
WETLAND UV 0.0161 AC.
WETLAND UW 0.0161 AC.
WETLAND UX 0.0161 AC.
WETLAND UY 0.0161 AC.
WETLAND UZ 0.0161 AC.
WETLAND VA 0.0161 AC.
WETLAND VB 0.0161 AC.
WETLAND VC 0.0161 AC.
WETLAND VD 0.0161 AC.
WETLAND VE 0.0161 AC.
WETLAND VF 0.0161 AC.
WETLAND VG 0.0161 AC.
WETLAND VH 0.0161 AC.
WETLAND VI 0.0161 AC.
WETLAND VJ 0.0161 AC.
WETLAND VK 0.0161 AC.
WETLAND VL 0.0161 AC.
WETLAND VM 0.0161 AC.
WETLAND VN 0.0161 AC.
WETLAND VO 0.0161 AC.
WETLAND VP 0.0161 AC.
WETLAND VQ 0.0161 AC.
WETLAND VR 0.0161 AC.
WETLAND VS 0.0161 AC.
WETLAND VT 0.0161 AC.
WETLAND VU 0.0161 AC.
WETLAND VV 0.0161 AC.
WETLAND VW 0.0161 AC.
WETLAND VX 0.0161 AC.
WETLAND VY 0.0161 AC.
WETLAND VZ 0.0161 AC.
WETLAND WA 0.0161 AC.
WETLAND WB 0.0161 AC.
WETLAND WC 0.0161 AC.
WETLAND WD 0.0161 AC.
WETLAND WE 0.0161 AC.
WETLAND WF 0.0161 AC.
WETLAND WG 0.0161 AC.
WETLAND WH 0.0161 AC.
WETLAND WI 0.0161 AC.
WETLAND WJ 0.0161 AC.
WETLAND WK 0.0161 AC.
WETLAND WL 0.0161 AC.
WETLAND WM 0.0161 AC.
WETLAND WN 0.0161 AC.
WETLAND WO 0.0161 AC.
WETLAND WP 0.0161 AC.
WETLAND WQ 0.0161 AC.
WETLAND WR 0.0161 AC.
WETLAND WS 0.0161 AC.
WETLAND WT 0.0161 AC.
WETLAND WU 0.0161 AC.
WETLAND WV 0.0161 AC.
WETLAND WW 0.0161 AC.
WETLAND WX 0.0161 AC.
WETLAND WY 0.0161 AC.
WETLAND WZ 0.0161 AC.
WETLAND XA 0.0161 AC.
WETLAND XB 0.0161 AC.
WETLAND XC 0.0161 AC.
WETLAND XD 0.0161 AC.
WETLAND XE 0.0161 AC.
WETLAND XF 0.0161 AC.
WETLAND XG 0.0161 AC.
WETLAND XH 0.0161 AC.
WETLAND XI 0.0161 AC.
WETLAND XJ 0.0161 AC.
WETLAND XK 0.0161 AC.
WETLAND XL 0.0161 AC.
WETLAND XM 0.0161 AC.
WETLAND XN 0.0161 AC.
WETLAND XO 0.0161 AC.
WETLAND XP 0.0161 AC.
WETLAND XQ 0.0161 AC.
WETLAND XR 0.0161 AC.
WETLAND XS 0.0161 AC.
WETLAND XT 0.0161 AC.
WETLAND XU 0.0161 AC.
WETLAND XV 0.0161 AC.
WETLAND XW 0.0161 AC.
WETLAND XX 0.0161 AC.
WETLAND XY 0.0161 AC.
WETLAND XZ 0.0161 AC.
WETLAND YA 0.0161 AC.
WETLAND YB 0.0161 AC.
WETLAND YC 0.0161 AC.
WETLAND YD 0.0161 AC.
WETLAND YE 0.0161 AC.
WETLAND YF 0.0161 AC.
WETLAND YG 0.0161 AC.
WETLAND YH 0.0161 AC.
WETLAND YI 0.0161 AC.
WETLAND YJ 0.0161 AC.
WETLAND YK 0.0161 AC.
WETLAND YL 0.0161 AC.
WETLAND YM 0.0161 AC.
WETLAND YN 0.0161 AC.
WETLAND YO 0.0161 AC.
WETLAND YP 0.0161 AC.
WETLAND YQ 0.0161 AC.
WETLAND YR 0.0161 AC.
WETLAND YS 0.0161 AC.
WETLAND YT 0.0161 AC.
WETLAND YU 0.0161 AC.
WETLAND YV 0.0161 AC.
WETLAND YW 0.0161 AC.
WETLAND YX 0.0161 AC.
WETLAND YY 0.0161 AC.
WETLAND YZ 0.0161 AC.
WETLAND ZA 0.0161 AC.
WETLAND ZB 0.0161 AC.
WETLAND ZC 0.0161 AC.
WETLAND ZD 0.0161 AC.
WETLAND ZE 0.0161 AC.
WETLAND ZF 0.0161 AC.
WETLAND ZG 0.0161 AC.
WETLAND ZH 0.0161 AC.
WETLAND ZI 0.0161 AC.
WETLAND ZJ 0.0161 AC.
WETLAND ZK 0.0161 AC.
WETLAND ZL 0.0161 AC.
WETLAND ZM 0.0161 AC.
WETLAND ZN 0.0161 AC.
WETLAND ZO 0.0161 AC.
WETLAND ZP 0.0161 AC.
WETLAND ZQ 0.0161 AC.
WETLAND ZR 0.0161 AC.
WETLAND ZS 0.0161 AC.
WETLAND ZT 0.0161 AC.
WETLAND ZU 0.0161 AC.
WETLAND ZV 0.0161 AC.
WETLAND ZW 0.0161 AC.
WETLAND ZX 0.0161 AC.
WETLAND ZY 0.0161 AC.
WETLAND ZZ 0.0161 AC.
WETLAND AAA 0.0161 AC.
WETLAND AAB 0.0161 AC.
WETLAND AAC 0.0161 AC.
WETLAND AAD 0.0161 AC.
WETLAND AAE 0.0161 AC.
WETLAND AAF 0.0161 AC.
WETLAND AAG 0.0161 AC.
WETLAND AAH 0.0161 AC.
WETLAND AAI 0.0161 AC.
WETLAND AAJ 0.0161 AC.
WETLAND AAK 0.0161 AC.
WETLAND AAL 0.0161 AC.
WETLAND AAM 0.0161 AC.
WETLAND AAN 0.0161 AC.
WETLAND AAO 0.0161 AC.
WETLAND AAP 0.0161 AC.
WETLAND AAQ 0.0161 AC.
WETLAND AAR 0.0161 AC.
WETLAND AAS 0.0161 AC.
WETLAND AAT 0.0161 AC.
WETLAND AAU 0.0161 AC.
WETLAND AAV 0.0161 AC.
WETLAND AAW 0.0161 AC.
WETLAND AAX 0.0161 AC.
WETLAND AAY 0.0161 AC.
WETLAND AAZ 0.0161 AC.
WETLAND ABA 0.0161 AC.
WETLAND ABB 0.0161 AC.
WETLAND ABC 0.0161 AC.
WETLAND ABD 0.0161 AC.
WETLAND ABE 0.0161 AC.
WETLAND ABF 0.0161 AC.
WETLAND ABG 0.0161 AC.
WETLAND ABH 0.0161 AC.
WETLAND ABI 0.0161 AC.
WETLAND ABJ 0.0161 AC.
WETLAND ABK 0.0161 AC.
WETLAND ABL 0.0161 AC.
WETLAND ABM 0.0161 AC.
WETLAND ABN 0.0161 AC.
WETLAND ABO 0.0161 AC.
WETLAND ABP 0.0161 AC.
WETLAND ABQ 0.0161 AC.
WETLAND ABR 0.0161 AC.
WETLAND ABS 0.0161 AC.
WETLAND ABT 0.0161 AC.
WETLAND ABU 0.0161 AC.
WETLAND ABV 0.0161 AC.
WETLAND ABW 0.0161 AC.
WETLAND ABX 0.0161 AC.
WETLAND ABY 0.0161 AC.
WETLAND ABZ 0.0161 AC.
WETLAND ACA 0.0161 AC.
WETLAND ACB 0.0161 AC.
WETLAND ACC 0.0161 AC.
WETLAND ACD 0.0161 AC.
WETLAND ACE 0.0161 AC.
WETLAND ACF 0.0161 AC.
WETLAND ACG 0.0161 AC.
WETLAND ACH 0.0161 AC.
WETLAND ACI 0.0161 AC.
WETLAND ACJ 0.0161 AC.
WETLAND ACK 0.0161 AC.
WETLAND ACL 0.0161 AC.
WETLAND ACM 0.0161 AC.
WETLAND ACN 0.0161 AC.
WETLAND ACO 0.0161 AC.
WETLAND ACP 0.0161 AC.
WETLAND ACQ 0.0161 AC.
WETLAND ACR 0.0161 AC.
WETLAND ACS 0.0161 AC.
WETLAND ACT 0.0161 AC.
WETLAND ACU 0.0161 AC.
WETLAND ACV 0.0161 AC.
WETLAND ACW 0.0161 AC.
WETLAND ACX 0.0161 AC.
WETLAND ACY 0.0161 AC.
WETLAND ACZ 0.0161 AC.
WETLAND ADA 0.0161 AC.
WETLAND ADB 0.0161 AC.
WETLAND ADC 0.0161 AC.
WETLAND ADD 0.0161 AC.
WETLAND ADE 0.0161 AC.
WETLAND ADF 0.0161 AC.
WETLAND ADG 0.0161 AC.
WETLAND ADH 0.0161 AC.
WETLAND ADI 0.0161 AC.
WETLAND ADJ 0.0161 AC.
WETLAND ADK 0.0161 AC.
WETLAND ADL 0.0161 AC.
WETLAND ADM 0.0161 AC.
WETLAND ADN 0.0161 AC.
WETLAND ADO 0.0161 AC.
WETLAND ADP 0.0161 AC.
WETLAND ADQ 0.0161 AC.
WETLAND ADR 0.0161 AC.
WETLAND ADS 0.0161 AC.
WETLAND ADT 0.0161 AC.
WETLAND ADU 0.0161 AC.
WETLAND ADV 0.0161 AC.
WETLAND ADW 0.0161 AC.
WETLAND ADX 0.0161 AC.
WETLAND ADY 0.0161 AC.
WETLAND ADZ 0.0161 AC.
WETLAND AEA 0.0161 AC.
WETLAND AEB 0.0161 AC.
WETLAND AEC 0.0161 AC.
WETLAND AED 0.0161 AC.
WETLAND AEE 0.0161 AC.
WETLAND AEF 0.0161 AC.
WETLAND AEG 0.0161 AC.
WETLAND AEH 0.0161 AC.
WETLAND AEI 0.0161 AC.
WETLAND AEJ 0.0161 AC.
WETLAND AEK 0.0161 AC.
WETLAND AEL 0.0161 AC.
WETLAND AEM 0.0161 AC.
WETLAND AEN 0.0161 AC.
WETLAND AEO 0.0161 AC.
WETLAND AEP 0.0161 AC.
WETLAND AEQ 0.0161 AC.
WETLAND AER 0.0161 AC.
WETLAND AES 0.0161 AC.
WETLAND AET 0.0161 AC.
WETLAND AEU 0.0161 AC.
WETLAND AEV 0.0161 AC.
WETLAND AEW 0.0161 AC.
WETLAND AEX 0.0161 AC.
WETLAND AEY 0.0161 AC.
WETLAND AEZ 0.0161 AC.
WETLAND AFA 0.0161 AC.
WETLAND AFB 0.0161 AC.
WETLAND AFC 0.0161 AC.
WETLAND AFD 0.0161 AC.
WETLAND AFE 0.0161 AC.
WETLAND AFF 0.0161 AC.
WETLAND AFG 0.0161 AC.
WETLAND AFH 0.0161 AC.
WETLAND AFI 0.0161 AC.
WETLAND AFJ 0.0161 AC.
WETLAND AFK 0.0161 AC.
WETLAND AFL 0.0161 AC.
W



B

NO.	REVISION	DATE
1	AS PER 09/17/20 HANOVER REV. LETTER	10/29/20

COMMONWEALTH OF PENNSYLVANIA
JOSEPH MICHAEL MARTIN
PROFESSIONAL ENGINEER
REGISTERED
049256

EXISTING CONDITIONS
APPLEBUTTER ROAD / SKYLINE DRIVE

LOWER SAUCON TWP. NORTHAMPTON CO.

PRELIMINARY / FINAL LAND DEVELOPMENT PLAN & SITE PLAN

Bethlehem Landfill Company

PENNSYLVANIA

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

PROJ. NO.	DWN. BY:	CHK. BY:
1162.4	MSH/DB	RMB
DSN. BY:		
JM		

SCALE: 100' 50' 0 100' 200'
Scale: 1" = 100'

CADD FILE: 1162.4-LDP-06,07.dwg

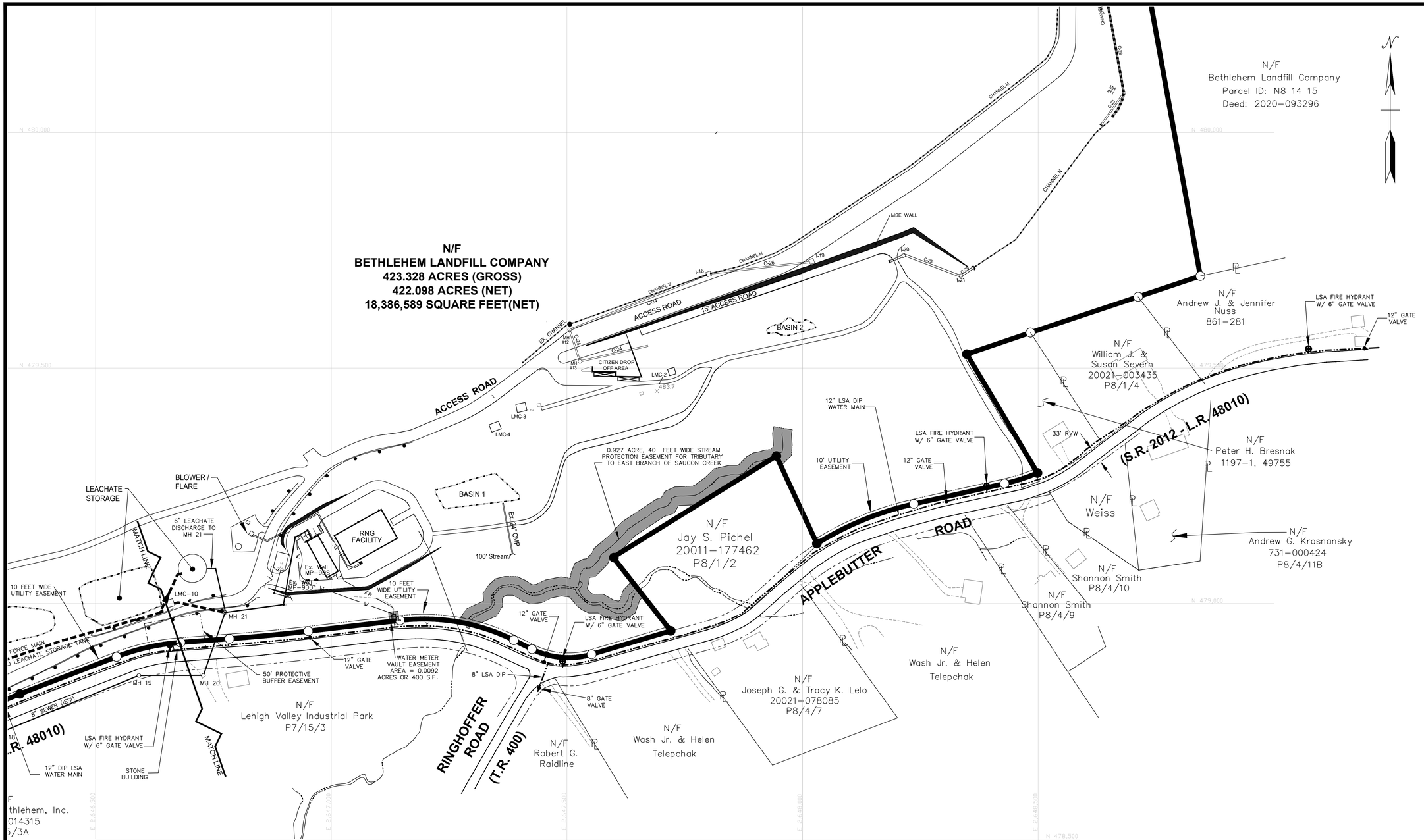
DATE: 08/10/20

SCALE: 1"=100'

DRAWING NO.

6 of 17

FILE: 1162.4 (NORTHERN EXPANSION) 1162.4-LDP-06,07.dwg



LEGEND

- LANDFILL PROPERTY LINE (423.328 ACRE CONSOLIDATED DEED)
- PL — ADJOINING PROPERTY LINE
- EDGE OF ROAD
- EASEMENT LINE
- RIGHT OF WAY LINE
- LEACHATE COLLECTION PIPE
- WATER LINE
- MH 19 — SEWER LINE
- FIRE HYDRANT
- WATER LINE GATE VALVE
- DIP — DUCTILE IRON PIPE
- LSA — LOWER SAUCON AUTHORITY
- LSA EASEMENT AREA

NOTE: WATER LINE LOCATION AND ASSOCIATED INFORMATION TAKEN FROM PLANS BY HANOVER ENGINEERING ASSOCIATES, INC. TITLED APPLEBUTTER ROAD PHASE III, SHEETS 1 (PMC) THRU 3 (PMC) DATED 6-25-93 AND APPLEBUTTER ROAD WATER PHASE III, SHEETS 1 OF 10 THRU 8 OF 10 DATED 6-21-94. NO FIELD SURVEY HAS BEEN CONDUCTED BY MARTIN & MARTIN, INC.

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL ENGINEER — JOSEPH MICHAEL MARCINKO — PE 082706

NO.	REVISION	DATE
1	AS PER 09/17/20 HANOVER REV. LETTER	10/29/20

EXISTING CONDITIONS - APPLEBUTTER ROAD

LOWER SAUCON TWP. — NORTHAMPTON CO. — PENNSYLVANIA

PRELIMINARY / FINAL LAND DEVELOPMENT PLAN & SITE PLAN

Bethlehem Landfill Company

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

PROJ. NO.	DWN. BY:	CHK. BY:	DSN. BY:
1162.4	MSH/DB	RMB	JM

SCALE: 1" = 100' (200' / 100' / 0 / 50' / 100')

CADD FILE: 1162.4-LDP-06,07.dwg

DATE: 08/10/20

SCALE: 1"=100'

DRAWING NO.

7 of 17

FILE: 1162.4 (NORTHERN EXPANSION) 1162.4-LDP-06,07.dwg

GENERAL NOTES:

The Bethlehem Landfill site is an existing permitted landfill in which the vast majority of the site has been developed as landfill. As shown on the Existing Natural Resources Plan and per discussions with Township staff and consultants, the currently approved disposal area (2015) is deemed not to contain any existing natural resources.

The Landfill Development Application for the Southeastern Realignment was the first Environmental Protection Analysis performed for Bethlehem Landfill. Subsequently in 2019 a second analysis was performed for the development of a recycled natural gas facility. Those impacted area are identified on the Northern Realignment Land Development Plans (Plan Sheets 8 and 9). The Northern Realignment proposes further impacts to environmental features including (Woodland and Steep Slopes). In order to comply with Section 18-95 of the LST Zoning Ordinance additional acreage is proposed to be added to the Bethlehem Landfill via lot consolidation. As such a "Table Top" analysis has been performed on the additional 198.857 acres to be added to the existing 224.47 acres landfill property previously analyzed.

BASE SITE AREA

In accordance with the Ordinance, the base site area is calculated by taking the gross property area from survey minus those rights-of-way and easements within the property as shown on plan Sheet 2 of 17. Where easements or rights-of-way overlap, only one easement or right-of-way is subtracted from the gross area. The calculation is as follows:

Gross Site Area: 423.328 ac.
Existing Rights-of-Way: (9.06 ac.) – (R/W outside scenic cons. easement area)
Land Within Easements: (201.81 ac.) – (Scenic cons. easement +2.95 ac. easements on former landfill tract.)
Base Site Area: 212.46 ac.

RESOURCE PROTECTION

As calculated above, the Base Site Area is 212.46 acres. Within this base area the resources described in the table below have been delineated along with the required resource protection area for each. As required where two (2) or more resources overlap, the one with the highest reservation was delineated hereon (Exhibit #1).

RESOURCE	REQUIRED RESERVATION	X	LAND IN RESOURCE	=	RESOURCE PROTECTION LAND
Wetlands	100%		1.96 ac.		1.96 ac.
Waters of the Commonwealth	100%		2.69 ac.		2.69 ac.
Env. Sensitive Woodlands	85%		24.60 ac.		20.91 ac.
Steep Slopes >25%	85%		21.50 ac.		18.28 ac.
Woodlands	80%		2.70 ac.		2.16 ac.
Steep Slopes 15% to 25%	70%		12.45 ac.		8.72 ac.
Steep Slopes 8% to 15%	60%		8.70 ac.		5.22 ac.
	TOTALS		74.60 ac.		59.94 ac.

BUILDABLE AREA

Utilizing the base site area and the total resource protected land the net buildable area is calculated as follows:

Base Site Area: 212.46 ac.
Req'd. Resource Protection Area: (59.94 ac.)
Buildable Site Area: 152.52 ac.

Upon development of the Northern Realignment, the total area of development including the Landfill Disposal Area, defined as the limit of disposal, will be 140.03 acres, which is less than the Buildable Site Area of 152.52 acres.

MAXIMUM IMPERVIOUS AREA

Calculation of the maximum impervious area is determined by multiplying the buildable site area times the maximum permitted impervious surfaces ratio. The subject property is located in three (3) zoning districts. Those districts are Light Industrial (LI), Light Manufacturing (LM) and Rural Agricultural (RA). The LI and LM districts have an allowable impervious ratio of 60% while the RA district maximum impervious ratio is 20%.

Given the low intensity of impervious surface associated with this development, and to be very conservative, the 20% impervious ratio was used to calculate the maximum allowable impervious surface for this analysis to document compliance with the ordinance. The maximum allowable impervious surface is calculated as follows:

Buildable Site Area (152.52 ac.) x 0.20 = 30.50 ac.

The proposed impervious area onsite, upon development of the Northern Realignment, is 14.86 acres. This includes 13.00 acres of existing impervious shown on the Existing Conditions Plan and 1.86 acres of proposed impervious surface shown on the site plan. Thus, the maximum allowable impervious surface area is not exceeded with the proposed development.

SITE CAPACITY CALCULATION SUMMARY

Base Site Area = 212.46 ac.
Net Buildable Site Area = 152.52 ac.
Max. Permitted Number of DU's = N/A
Max. Permitted Impervious Surfaces = 30.50 ac.

WETLANDS AND WETLAND BUFFERS

Based upon wetland determination and study performed onsite, nine (9) wetlands exist within the consolidated lot having a total acreage of 2.22 acres. No wetlands shall be impacted as a result of the development as required by the Ordinance. Further, by Ordinance a wetland buffer consists of an area within 50 feet of a wetland boundary. No impacts are proposed within 50 feet of a wetland, thus the wetland buffers are not impacted, meeting the 85% protection rate.

RIPARIAN BUFFERS / WATERS OF THE COMMONWEALTH

Unnamed tributaries to the East Branch of Saucon Creek, Bull Run and unnamed tributaries to the Lehigh River are located within the consolidated lot. Stream protection easements having a total width of 100 feet (50 feet each side of the stream) have been delineated and described by bearing and distance for all waterways within the consolidated lot. No stream protection easement areas will be impacted as a result of the proposed development meeting the required protection rate of 100% for waters of the Commonwealth. Further as defined on previous plan approvals for the landfill, a 75 foot riparian buffer is defined on the previous landfill lot. New riparian buffer area has been identified as being 100 feet from waterways delineated on the Helms and Reddington Parcels. The current Ordinance defines the riparian buffer as 100 feet from the stream or waterway. Riparian buffer areas have a protection rate of 85%. The Northern Realignment proposes no impacts to the previously defined 75' riparian buffer on the former landfill lot or the Ordinance defined 100' riparian buffer. Thus, the Ordinance protection requirement is met.

STEEP SLOPES

Steep slopes are those which exceed 8% having an area greater than 3,000 square feet. A breakdown of steep slopes along with required protection rates are as follows:

- Steep slopes 8% to 15% - Protection Rate 60%
- Steep slopes 15% to 25% - Protection Rate 70%
- Steep slopes greater than 25% - Protection Rate 85%

The Table below outlines the total amount of steep slopes for each category along with the percentage protection based upon the impacted area as a result of the current Northern Realignment and previous landfill development (Southeastern Realignment & RNG Facility). Refer to Exhibit #2 (on Sheet 9 of 18).

Steep Slope	Total Resource Area	Impacted Area	Protection Rate (Allowable)
8% to 15%	67.3 ac.	4.5 ac.	93.3% (60%)
15% to 25%	90.6 ac.	5.1 ac.	94.4% (70%)
Greater than 25%	94.8 ac.	13 ac.	86.3% (85%)

As shown above the required protection rate for each steep slope category is met upon development of the Northern Realignment.

WOODLANDS

Woodlands are defined as all areas of 3,000 square feet or more which contain an average of one or more trees measuring six inches in caliper or greater per 1,000 square feet.

In addition, woodlands meeting the criteria above which also co-exist with other resources (steep slopes, wetlands, floodplains) are considered environmentally sensitive woodlands. For the purposes of defining the limits of woodlands onsite, the 2013 aerial photography was utilized. The required protection rates for Woodland and Environmentally Sensitive Woodlands is 80% and 85% respectively. The table below outlines the total amount of woodlands and environmentally sensitive woodlands, areas of impact and the percentage protection as a result of the current Northern Realignment and the previous Landfill Development (Southeastern Realignment and RNG Facility). Refer to Exhibit #3 on Sheet 9 of 18.

Woodlands	Resource Total Area	Impacted Area	Protection Rate (Allowable)
Woodlands	220 ac.	10.16 ac.	95.4% (80%)
Env. Sen. Woodlands	195.50 ac.	10.05 ac.	94.9% (85%)

As outlined above, the required protection rate for all woodlands is met upon development of the Northern Realignment.

FLOODPLAIN AND FLOODPLAIN SOILS

As per FIRM Map Number 42095C0335E dated July 16, 2014 and a review of soils located within the property against those listed as floodplain soils within the Lower Saucon Township Zoning Ordinance, floodplains exist but floodplain soils do not exist within the property. The floodplain is associated with Bull Run on the former Reddington Property. No development is proposed within the former Reddington tract, thus the 100% protection rate is met.

LAKES AND PONDS

No lakes or ponds exist within the property of the Landfill. The Northern Realignment proposes no impacts to lakes or ponds or lake and pond buffers onsite, thus meeting the 100% protection rate for lakes and ponds and the 85% protection rate for buffers as prescribed by the Ordinance. For this analysis, as previously determined by the Township, existing sediment/stormwater basins were not considered lakes or ponds.

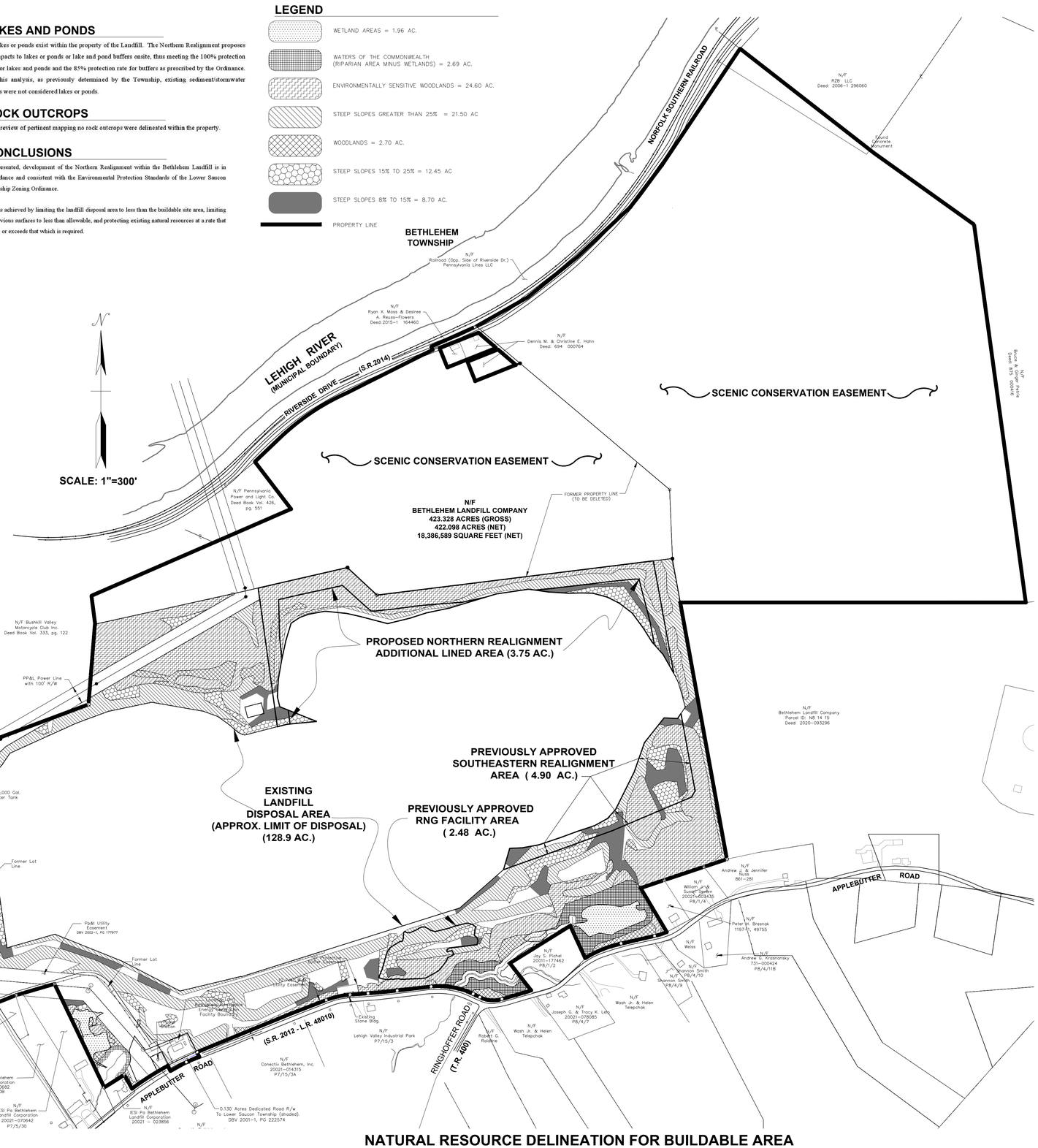
ROCK OUTCROPS

Upon review of pertinent mapping no rock outcrops were delineated within the property.

CONCLUSIONS

As presented, development of the Northern Realignment within the Bethlehem Landfill is in accordance and consistent with the Environmental Protection Standards of the Lower Saucon Township Zoning Ordinance.

This is achieved by limiting the landfill disposal area to less than the buildable site area, limiting impervious surfaces to less than allowable, and protecting existing natural resources at a rate that meets or exceeds that which is required.



NATURAL RESOURCE DELINEATION FOR BUILDABLE AREA AND MAXIMUM IMPERVIOUS AREA CALCULATIONS (EXHIBIT 1)

FILE: 1162.4 (NORTHERN EXPANSION) 1162.4-LDP-08.dwg

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL JOSEPH M. CHILL ENGINEER 041878 PENNSYLVANIA

NO.	REVISION	DATE
1	AS PER 09/17/20 HANOVER REV. LETTER	10/29/20

EXISTING NATURAL RESOURCES PLAN

LOWER SAUCON TWP. — NORTHAMPTON CO.

PRELIMINARY / FINAL LAND DEVELOPMENT PLAN & SITE PLAN

Bethlehem Landfill Company

PENNSYLVANIA

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

PROJ. NO. 1162.4 | DWN. BY: MSH/DB | CHK. BY: RWB | DSN. BY: JM | SCALE: AS NOTED

CADD FILE: 1162.4-LDP-08.dwg

DATE: 08/10/20

SCALE: AS NOTED

DRAWING NO. **8 of 17**

LEGEND

- (ENVIRONMENTALLY SENSITIVE WOODLANDS 195.50 ACRES)
- WOODLANDS (220.00 ACRES)
- = IMPACTED AREA (25.46 ACRES)
- = PROPERTY LINE

SOUTHEASTERN REALIGNMENT

NATURAL RESOURCE IMPACTS

ENVIRONMENTALLY SENSITIVE WOODLAND (3.7 AC.)
WOODLANDS (3.6 AC.)

RNG NATURAL RESOURCE IMPACTS

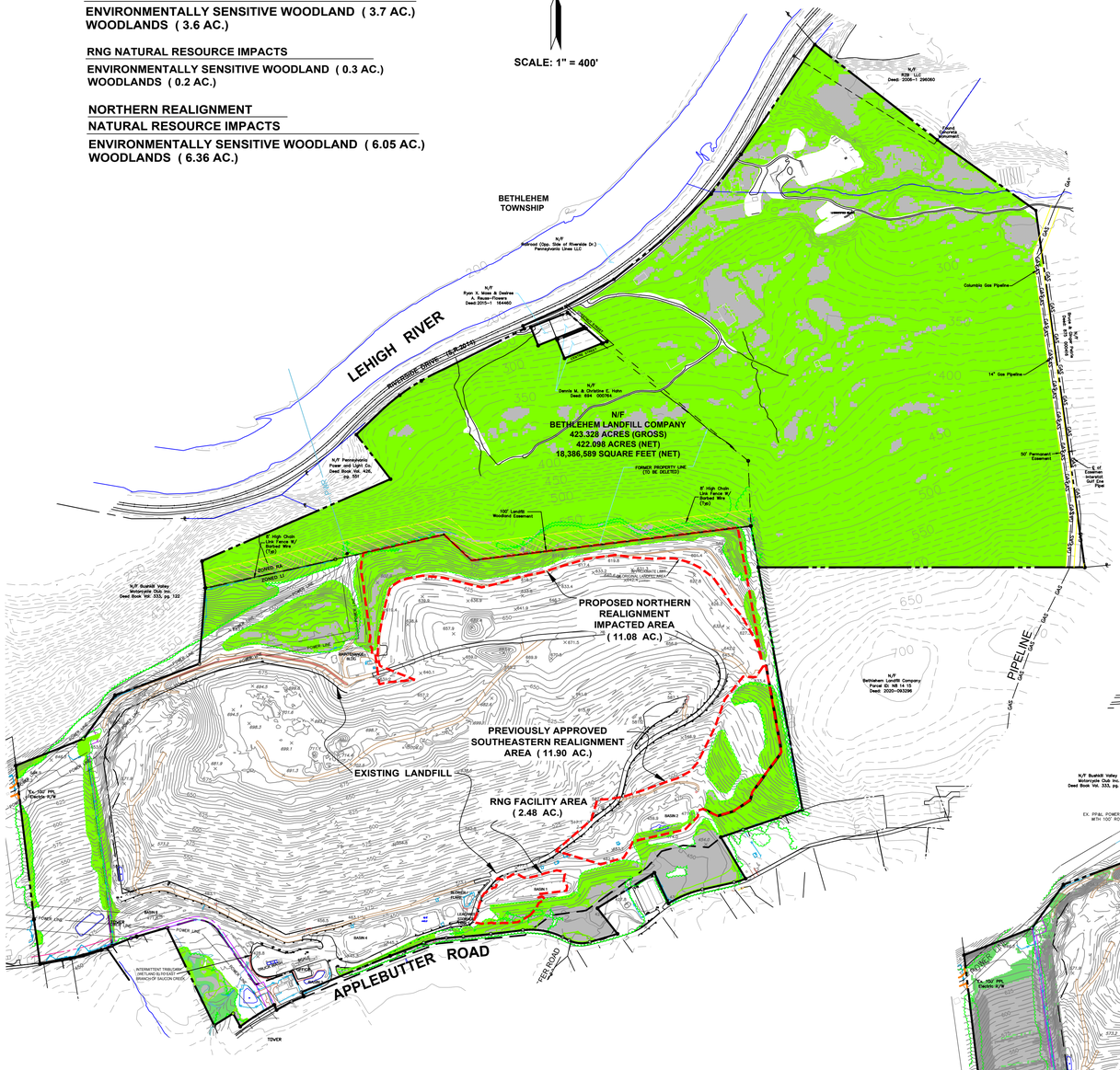
ENVIRONMENTALLY SENSITIVE WOODLAND (0.3 AC.)
WOODLANDS (0.2 AC.)

NORTHERN REALIGNMENT

NATURAL RESOURCE IMPACTS

ENVIRONMENTALLY SENSITIVE WOODLAND (6.05 AC.)
WOODLANDS (6.36 AC.)

SCALE: 1" = 400'



WOODLAND NATURAL RESOURCE PLAN
(EXHIBIT 3)

LEGEND

- STEEP SLOPES 8 to 15 % (67.3 ACRES)
- STEEP SLOPES 15 to 25 % (90.6 ACRES)
- STEEP SLOPES > 25 % (94.8 ACRES)
- = IMPACTED AREA (25.46 ACRES)
- = PROPERTY LINE

SOUTHEASTERN REALIGNMENT

NATURAL RESOURCE IMPACTS

STEEP SLOPES 8% TO 15% (2.9 AC.)
STEEP SLOPES 15% TO 25% (3.0 AC.)
STEEP SLOPES GREATER THAN 25 % (4.6 AC.)

RNG NATURAL RESOURCE IMPACTS

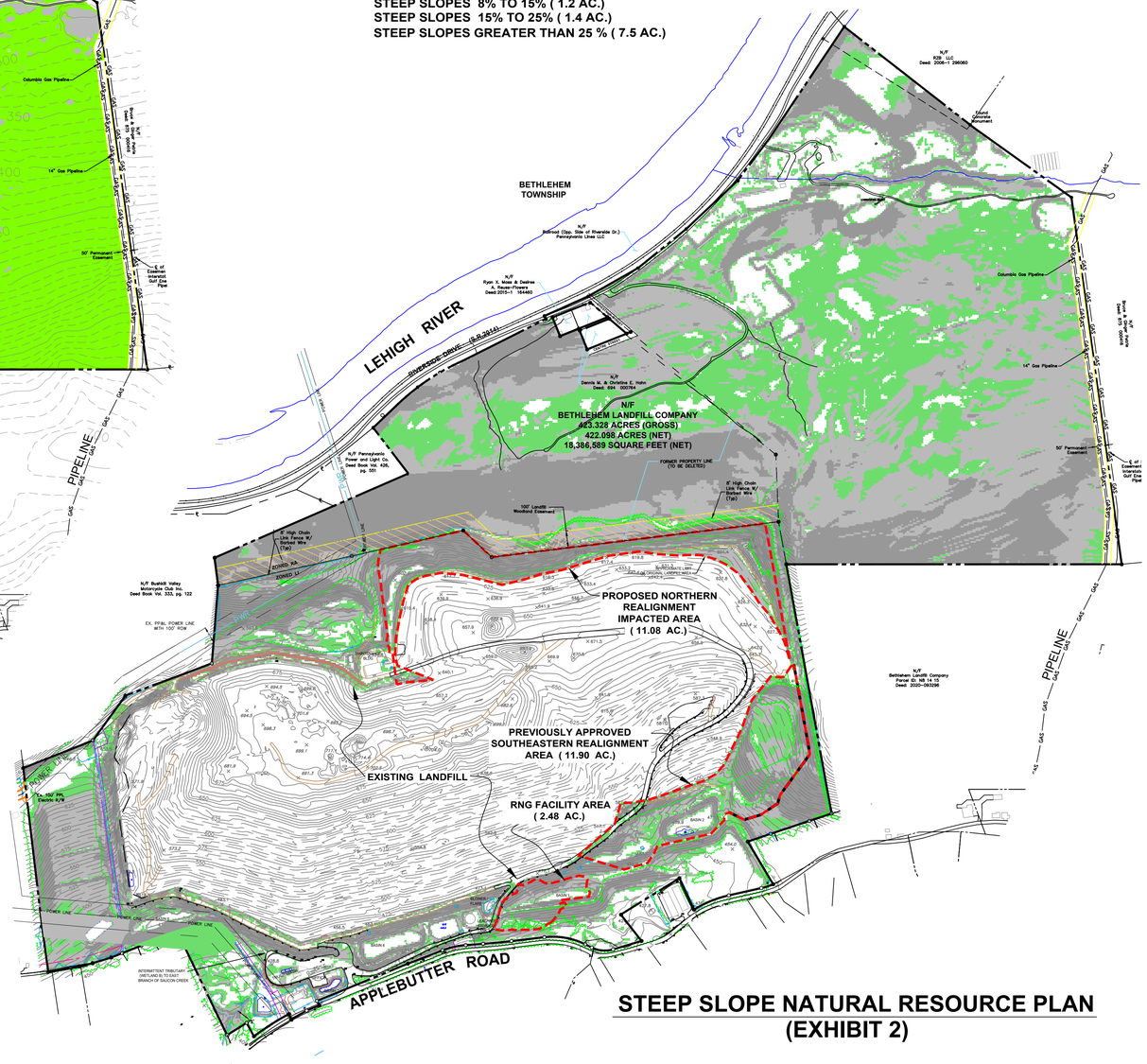
STEEP SLOPES 8% TO 15% (0.4 AC.)
STEEP SLOPES 15% TO 25% (0.7 AC.)
STEEP SLOPES GREATER THAN 25 % (0.9 AC.)

NORTHERN REALIGNMENT

NATURAL RESOURCE IMPACTS

STEEP SLOPES 8% TO 15% (1.2 AC.)
STEEP SLOPES 15% TO 25% (1.4 AC.)
STEEP SLOPES GREATER THAN 25 % (7.5 AC.)

SCALE: 1" = 400'



STEEP SLOPE NATURAL RESOURCE PLAN
(EXHIBIT 2)

NO.	REVISION	DATE
1	AS PER 09/17/20 HANOVER REV. LETTER	10/29/20

EXISTING NATURAL RESOURCES PLAN

LOWER SAUCON TWP. NORTHAMPTON CO.

PRELIMINARY / FINAL LAND DEVELOPMENT PLAN & SITE PLAN

Bethlehem Landfill Company

PENNSYLVANIA

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

PROJ. NO. 1162.4 | DWN. BY: MSH/DB | CHK. BY: RMB | DSN. BY: JM | SCALE: AS NOTED

CADD FILE: 1162.4-LDP-09.dwg

DATE: 08/10/20

SCALE: AS NOTED

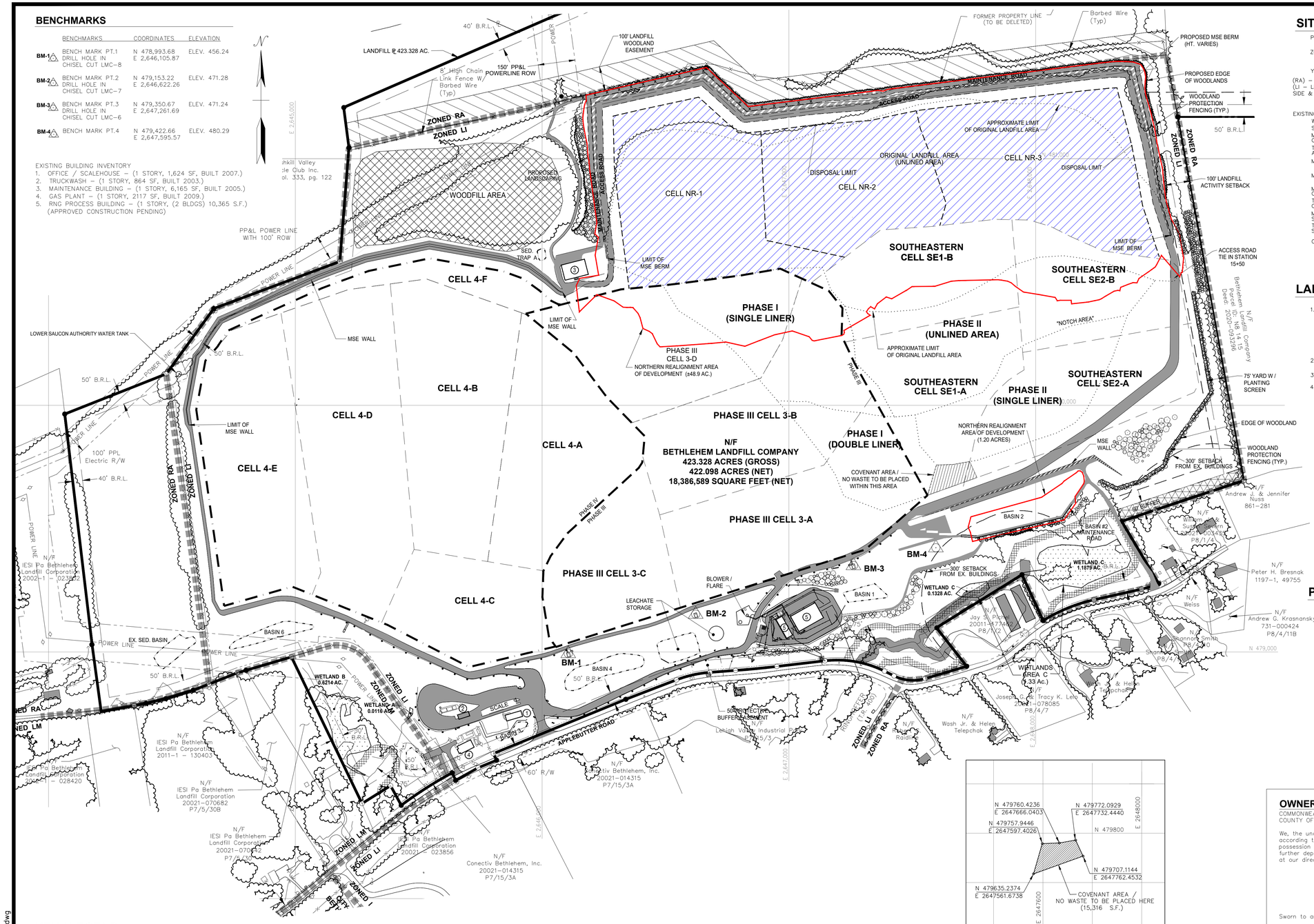
DRAWING NO. 9 of 17

CADD FILE: 1162.4 (NORTHERN EXPANSION) 1162.4-LDP-08,09.dwg

BENCHMARKS

	BENCHMARKS	COORDINATES	ELEVATION
BM-1	BENCH MARK PT.1 DRILL HOLE IN CHISEL CUT LMC–8	N 478,993.68 E 2,646,105.87	ELEV. 456.24
BM-2	BENCH MARK PT.2 DRILL HOLE IN CHISEL CUT LMC–7	N 479,153.22 E 2,646,622.26	ELEV. 471.28
BM-3	BENCH MARK PT.3 DRILL HOLE IN CHISEL CUT LMC–6	N 479,350.67 E 2,647,261.69	ELEV. 471.24
BM-4	BENCH MARK PT.4	N 479,422.66 E 2,647,595.57	ELEV. 480.29

EXISTING BUILDING INVENTORY
1. OFFICE / SCALEHOUSE – (1 STORY, 1,624 SF, BUILT 2007.)
2. TRUCKWASH – (1 STORY, 864 SF, BUILT 2003.)
3. MAINTENANCE BUILDING – (1 STORY, 6,165 SF, BUILT 2005.)
4. GAS PLANT – (1 STORY, 2117 SF, BUILT 2009.)
5. RNG PROCESS BUILDING – (1 STORY, (2 BLDGS) 10,365 S.F.) (APPROVED CONSTRUCTION PENDING)



SITE DATA:

PROPERTY AREA: 423.328 AC. (GROSS)
MIN REQ'D = 4 ACRES.

ZONING DISTRICT: LI (LIGHT INDUSTRIAL), RA (RURAL AGRICULTURAL)
LM (LIGHT MANUFACTURING)

YARD REQUIREMENTS:
(RA) – FRONT: MIN. 50 FEET; SIDE; MIN. 40 FEET; REAR: MIN. 50 FEET.
(LI – LM) – FRONT: MIN. 50 FEET; SIDE: 50 FEET; REAR MIN. 50 FEET
SIDE & REAR = 75 FT. MIN. FOR LI ZONED PROPERTY ABUTTING RESIDENTIAL

EXISTING & PROPOSED USE:	LANDFILL, LI DISTRICT & RNG FACILITY AS ACCESSORY USE
WATER:	PUBLIC WATER (LOWER SAUCON AUTHORITY)
SEWER:	PUBLIC SEWER (LOWER SAUCON AUTHORITY)
MAXIMUM IMPERVIOUS COVERAGE:	30.50 ACRES (AS PER 180.95 ANALYSIS)
TOTAL IMPERVIOUS AREA::	14.86 ACRES (EXISTING =13.00 AC. PROPOSED =1.86 AC.)
MIMIMUM LOT WIDTH:	300 FEET (INDUSTRIAL USE) NO SUBDIVISION PROPOSED
MAXIMUM HEIGHT:	35 FEET (RA), 50 FEET (LI, LM, INDUSTRIAL USE) NO BUILDING PROPOSED
MAXIMUM BUILDING COVERAGE:	30%
TOTAL BUILDING COVERAGE:	<1% (NO BUILDINGS PROPOSED)
MAXIMUM BUILDABLE SITE AREA:	152.52 AC. (AS PER 180.95 ANALYSIS)
TOTAL BUILDABLE SITE AREA:	140.03 AC. (LIMIT OF DISPOSAL)
OFFSTREET PARKING:	NO PROPOSED OR MODIFICATIONS TO OFFSTREET PARKING AREAS ARE PROPOSED

LANDSCAPING AND SCREENING DATA:

1. SETBACKS:
   EARTHEN BERMS – 50 FEET FROM PROPERTY BOUNDARY
   LANDFILL ACTIVITIES * –100 FEET FROM PROPERTY BOUNDARY
   LANDFILL ACTIVITIES * –100 FEET FROM PUBLIC ROAD R/W
   LANDFILL ACTIVITIES * –300 FEET FROM OCCUPIED DWELLING OR COMMERCIAL / INDUSTRIAL BUILDING
   * LIMIT OF DISPOSAL
2. MINIMUM BUFFER YARD WIDTH: 20 FEET
3. PROPOSED BUFFER YARD WIDTH: 50 FEET (LIMITS AS DEPICTED HEREON)
4. NO PERIMETER EARTHEN BERM IS PROPOSED FOR THE AREA WHERE NEW DISPOSAL AREA WILL BE LOCATED. PURSUANT TO SECTION 180–109.F (2) (a) BLC RESPECTFULLY REQUEST THAT TOWNSHIP COUNCIL DETERMINE THAT THE EXISTING FEATURES SERVE AS AN ACCEPTABLE SUBSTITUTE FOR THE BERM REQUIREMENTS. EXISTING LANDSCAPE FEATURES (TREES, SHRUBS & GROUND COVER) ARE MAINTAINED WITHIN 80 FEET OF THE EASTERN PROPERTY LINE AND 100 FEET OF WOODLAND ON THE NORTHERN PROPERTY LINE. CONSTRUCTION OF A PERIMETER BERM WOULD RESULT IN REMOVAL OF THE EXISTING LANDSCAPE FEATURES IN THESE AREAS.

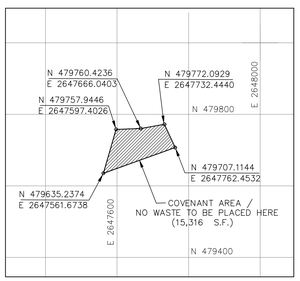
RELIEF FROM THE PERIMETER EARTHEN BERM REQUIREMENT FOR THE NORTHERN REALIGNMENT WAS GRANTED BY LOWER SAUCON TOWNSHIP COUNCIL ON 10/07/2020

POST CONSTRUCTION STORMWATER BASIN 100 YR. PEAK ELEVATIONS

STORMWATER BASIN ID	100 YEAR ROUTED ELEVATION
BASIN #1	447.63
BASIN #2	476.37
BASIN #3	423.34
BASIN #4	442.19
BASIN #6	468.45

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) LIMIT OF DISPOSAL SOUTHEASTERN (DOUBLE LINER)
- CELL DIVISION
- ADJOINING PROPERTY LINE
- LANDFILL PROPERTY LINE (423.328 ACRE PENDING LOT CONSOLIDATION)
- DEP PERMIT BOUNDARY AS TAKEN FROM MARCH 1994 PERMIT DRAWINGS
- POWER LINE – 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
- WETLAND AREAS
- RIPARIAN CORRIDOR BUFFER
- STREAM PROTECTION EASEMENT
- WOOD LINES, TREE MASSES
- LANDFILL WOODLAND EASEMENT
- WOODFILL AREA
- NORTHERN REALIGNMENT – MSE BERM
- ACCESS ROAD – NORTHERN REALIGNMENT – ACCESS ROAD
- MAINTENANCE ROAD – NORTHERN REALIGNMENT – MAINTENANCE ROAD
- NORTHERN REALIGNMENT – AREA OF DEVELOPMENT
- NORTHERN REALIGNMENT – CELL DIVISION
- NORTHERN REALIGNMENT – LIMIT OF DISPOSAL
- 50' BUFFER W/PLANTING SCREEN
- WOODLAND PROTECTION FENCING
- PROPOSED EDGE OF WOODLANDS
- NORTHERN REALIGNMENT PROP. NEW LINER AREA
- EX. LANDSCAPING
- NORTHERN REALIGNMENT PROP. LANDSCAPING



COVENANT AREA / NO WASTE TO BE PLACED HERE DETAIL

SCALE: 1"=200'

OWNER'S CERTIFICATION

COMMONWEALTH OF PENNSYLVANIA
COUNTY OF NORTHAMPTON

We, the undersigned, the owners of the property shown on this plan, being duly sworn according to law, depose and say that we are sole owners of this property in peaceful possession of the same and that no suits pending affecting the title of the same. We further depose and say that this plan was made at our direction and that we desire the same to be recorded.

_____ (OWNER) PRINT

_____ (OWNER) SIGNATURE

Sworn to and subscribed before me this

_____day of _____20___.

_____ NOTARY PUBLIC

LEHIGH VALLEY PLANNING COMMISSION REVIEW

Reviewed by the Leigh Valley Planning Commission

_____ DATE _____ PLANNER

TOWNSHIP PLANNING COMMISSION RECOMENDATIONS

Recommended for approval by the Lower Saucon Township Planning Commission this

_____day of _____20___.

_____ CHAIRMAN _____ SECRETARY

TOWNSHIP COUNCIL APPROVAL AND TOWNSHIP ENGINEER REVIEW

Approved by the Lower Saucon Township Council this

_____day of _____20___.

_____ SECRETARY _____ COUNCIL PRESIDENT

Reviewed by:

_____ TOWNSHIP ENGINEER

This _____ day of _____20___.

COMMONWEALTH OF PENNSYLVANIA – JOSEPH M. CHILL, JR. – PROFESSIONAL ENGINEER – REGISTERED – PENNSYLVANIA

NO.	REVISION	DATE
1	AS PER 09/17/20 HANOVER REV. LETTER	10/29/20

LAND DEVELOPMENT PLAN

NORTHAMPTON CO.

PRELIMINARY / FINAL LAND DEVELOPMENT PLAN & SITE PLAN

Bethlehem Landfill Company

LOWER SAUCON TWP. PENNSYLVANIA

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

SCALE: 1" = 200'
DWN. BY: DB
CHK. BY: RMB
PROJ. NO.: 1162.4
DSN. BY: JM

CADD FILE: 1162.4–LDP–10.dwg

DATE: 08/10/20

SCALE: 1" = 200'

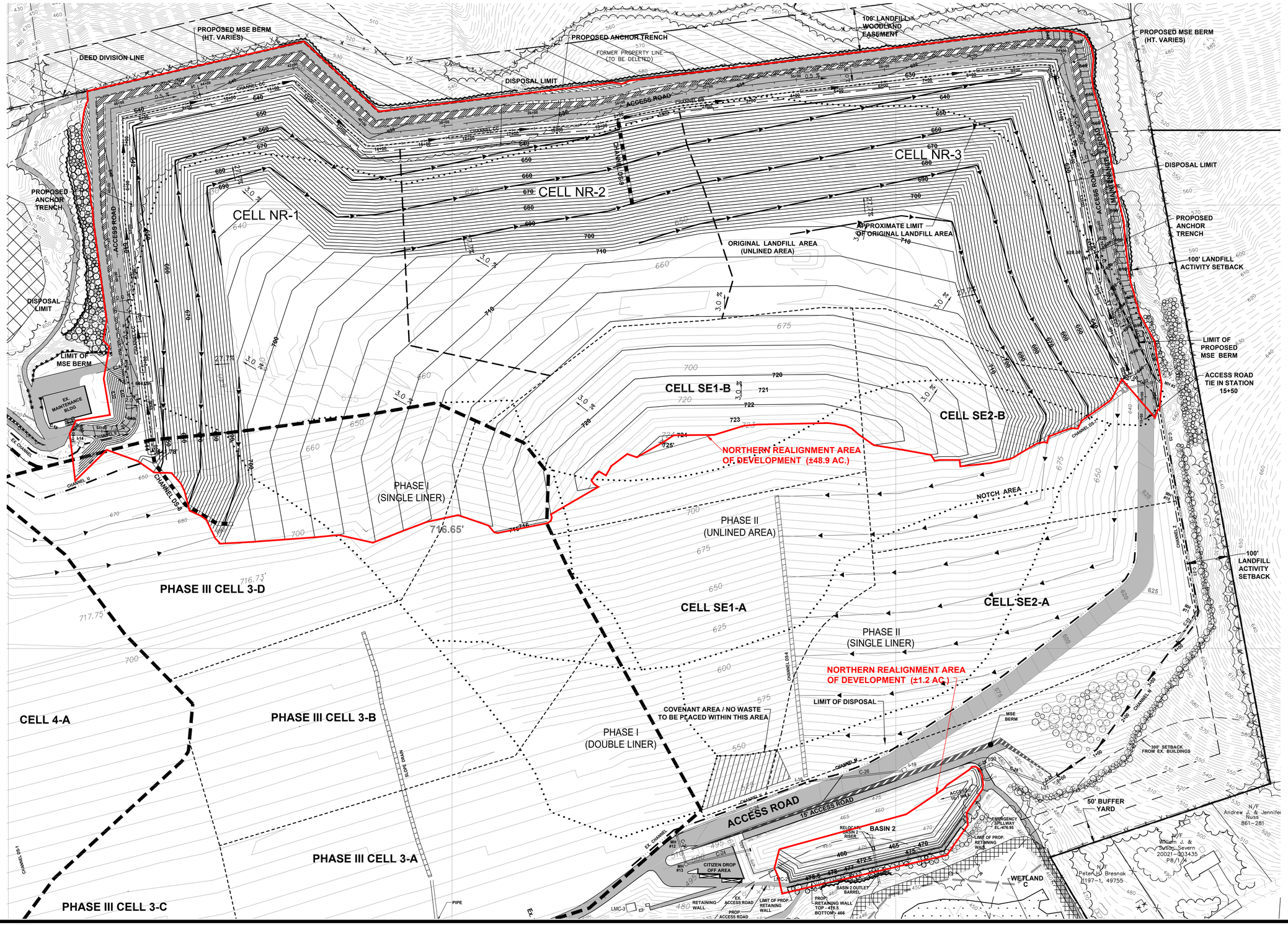
DRAWING NO.

10 of 17

FILE: 1162.4 (NORTHERN EXPANSION) 1162.4–LDP–10.dwg

KEY / LEGEND

- LIMIT OF ORIGINAL LANDFILL, PHASE I AND PHASE II DISPOSAL AREAS
- LIMIT OF DISPOSAL PHASE IV (DOUBLE LINER)
- CELL DIVISION
- ADJOINING PROPERTY LINE
- LANDFILL PROPERTY LINE (423.328 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.)
- 720 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
- NORTHERN REALIGNMENT – MSE BERM
- ACCESS ROAD – NORTHERN REALIGNMENT – ACCESS ROAD
- MAINTENANCE ROAD – NORTHERN REALIGNMENT – MAINTENANCE ROAD
- SOUTHEASTERN REALIGNMENT – CELL DIVISION
- 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)
- NORTHERN REALIGNMENT – LIMIT OF DISPOSAL
- DEED DIVISION LINE
- PROP. WOOD LINE
- WOODLAND PROTECTION FENCING
- NORTHERN REALIGNMENT – AREA OF DEVELOPMENT



NO.	REVISION	DATE
1	AS PER 09/17/20 HANOVER REV. LETTER	10/29/20

GRADING PLAN (1"=100')

PRELIMINARY / FINAL LAND DEVELOPMENT PLAN & SITE PLAN

NORTHAMPTON CO.

LOWER SAUCON TWP.

Bethlehem Landfill Company

PENNSYLVANIA

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

SCALE: 100' 50' 0 100' 200' Scale: 1" = 100'

DWN. BY: DB | CHK. BY: RMB

PROJ. NO.: 1162.4 | DSN. BY: JM

CADD FILE: 1162.4–LDP–11.dwg

DATE: 08/10/20

SCALE: 1" = 100'

DRAWING NO.

11 of 17

FILE: 1162.4 (NORTHERN EXPANSION) 1162.4–LDP–11.dwg

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
- POWER LINE — 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
- NORTHERN REALIGNMENT MSE BERM
- ACCESS ROAD — NORTHERN REALIGNMENT ACCESS ROAD
- MAINTENANCE ROAD — NORTHERN REALIGNMENT MAINTENANCE ROAD
- NORTHERN REALIGNMENT AREA OF DEVELOPMENT
- NORTHERN REALIGNMENT CELL DIVISION
- NORTHERN 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 MSE BERM (HT. VARIES)

DEED DIVISION LINE

PROPOSED ANCHOR TRENCH

FORMER PROPERTY LINE (TO BE DELETED)

DISPOSAL LIMIT

MATCH LINE

MAINTENANCE ROAD

ACCESS ROAD

CHANNEL CC

CHANNEL DS-6

CHANNEL DS-8

CHANNEL E

CHANNEL U

PROPOSED CHANNEL SLOPE: 0.5 % LENGTH: ± 3351'

644.29'

641.78'

716.65'

LIMIT OF MSE BERM

EX. MAINTENANCE BLDG

I-14

CELL NR-1

CELL NR-2

PHASE I (SINGLE LINER)

FILE: 1162.4 (NORTHERN EXPANSION) 1162.4-LDP-12,13.dwg

COMMONWEALTH OF PENNSYLVANIA — JOSEPH MICHAEL MARTIN — REGISTERED PROFESSIONAL ENGINEER — MARTSTONE — PENNSYLVANIA

NO.	REVISION	DATE
1	AS PER 09/17/20 HANOVER REV. LETTER	10/29/20

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

PRELIMINARY / FINAL LAND DEVELOPMENT PLAN & SITE PLAN

LOWER SAUCON TWP. — NORTHAMPTON CO.

Bethlehem Landfill Company

PENNSYLVANIA

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

SCALE: 50' 25' 0 50' 100' Scale: 1" = 50'

DWN. BY: DB — CHK. BY: RMB

PROJ. NO. 1162.4 — DSN. BY: JM

CADD FILE: 1162.4-LDP-12,13.dwg

DATE: 08/10/20

SCALE: 1" = 50'

DRAWING NO.

12 of 17

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
- POWER LINE — 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
- NORTHERN REALIGNMENT MSE BERM
- ACCESS ROAD — NORTHERN REALIGNMENT ACCESS ROAD
- MAINTENANCE ROAD — NORTHERN REALIGNMENT MAINTENANCE ROAD
- NORTHERN REALIGNMENT AREA OF DEVELOPMENT
- NORTHERN REALIGNMENT CELL DIVISION
- NORTHERN 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

MATCH LINE

100' LANDFILL WOODLAND EASEMENT

NORTHERN REALIGNMENT AREA OF DEVELOPMENT (±48.9 AC.)

FORMER PROPERTY LINE (TO BE DELETED)

PROPOSED MSE BERM (HT. VARIES)

MAINTENANCE ROAD

ACCESS ROAD

CHANNEL BB

CHANNEL AA

DISPOSAL LIMIT

N/F
Bethlehem Landfill Company
Parcel ID: N8 14 15
Deed: 2020-093296

PROPOSED ANCHOR TRENCH

100' LANDFILL ACTIVITY SETBACK

PROPOSED CHANNEL SLOPE: 4.1 %
LENGTH: ± 290'

MAINTENANCE ROAD GRADING <20' FROM THIS POINT TO INTERSECTION WITH HAUL ROAD

LIMIT OF PROPOSED MSE BERM

ACCESS ROAD TIE IN STATION 15+50

APPROXIMATE LIMIT OF ORIGINAL LANDFILL AREA

ORIGINAL LANDFILL AREA (UNLINED AREA)

CELL NR-3

CELL SE1-B

CELL SE2-B

CHANNEL DS-7

MH #14

MH #3

628.00

637.00

3.0 %

27.7 %

N

MATCH LINE

FILE: 1162.4 (NORTHERN EXPANSION) 1162.4-LDP-12,13.dwg

NO.	REVISION	DATE
1	AS PER 09/17/20 HANOVER REV. LETTER	10/29/20

COMMONWEALTH OF PENNSYLVANIA — JOSEPH M. CHILLEMI — REGISTERED PROFESSIONAL ENGINEER

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

LOWER SAUCON TWP. — NORTHAMPTON CO.

PRELIMINARY / FINAL LAND DEVELOPMENT PLAN & SITE PLAN

Bethlehem Landfill Company

PENNSYLVANIA

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

PROJ. NO.	DWN. BY:	CHK. BY:
1162.4	DB	RMB
DSN. BY:		
JM		

SCALE: 50' 25' 0 50' 100' — Scale: 1" = 50'

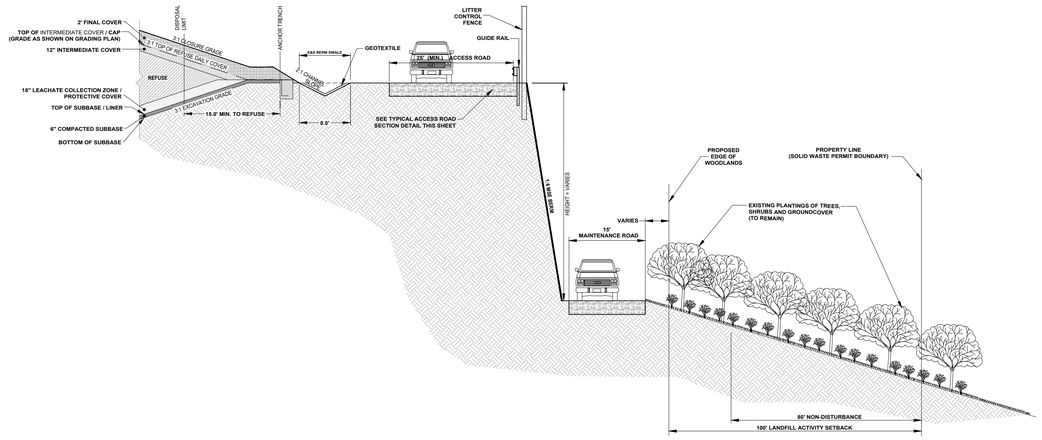
CADD FILE: 1162.4-LDP-12,13.dwg

DATE: 08/10/20

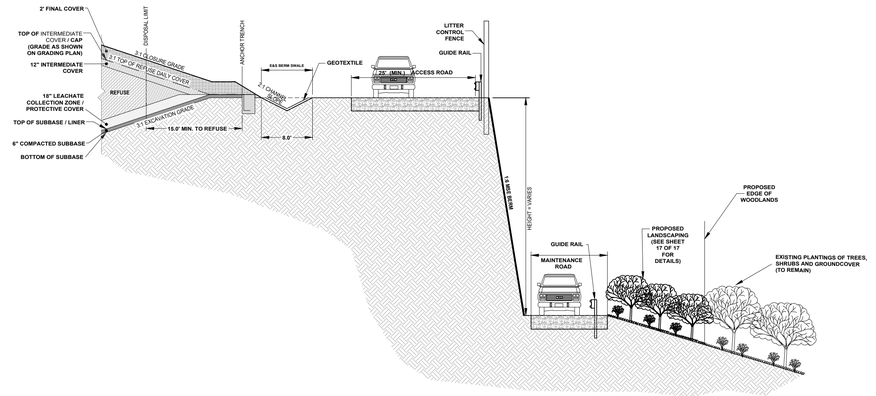
SCALE: 1" = 50'

DRAWING NO.

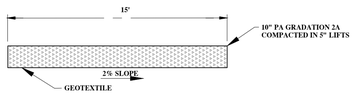
13 of 17



TYPICAL LANDFILL ACCESS ROAD / MSE BERM SECTION - STA. 15+50 TO STA. 24+00



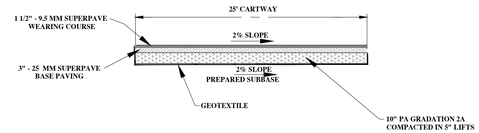
TYPICAL LANDFILL ACCESS ROAD / MSE BERM SECTION STA. 46+20 TO 54+65



TYPICAL MAINTENANCE ROAD SECTION DETAIL (GRAVEL)

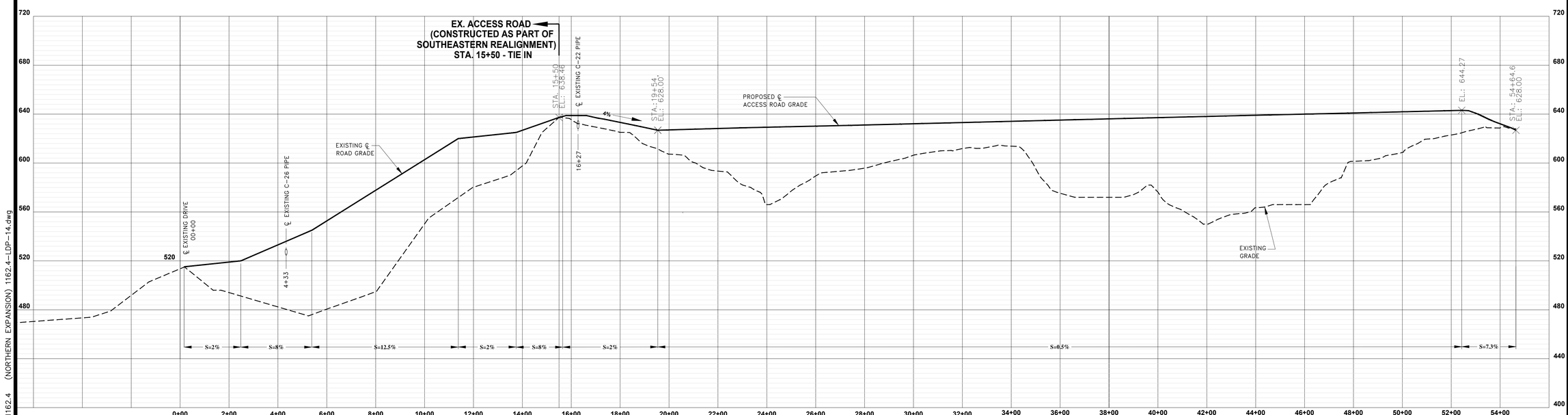
NOT TO SCALE

TYPICAL LANDFILL ACCESS ROAD / MSE BERM SECTION STA. 24+00 TO 46+20



TYPICAL ACCESS ROAD SECTION DETAIL (PAVED) STA. 15+50 TO 54+65

NOT TO SCALE



NO.	REVISION	DATE
1	AS PER 09/17/20 HANOVER REV. LETTER	10/29/20

JOSEPH M. MARTIN, JR. PROFESSIONAL ENGINEER 081537036 COMMONWEALTH OF PENNSYLVANIA REGISTERED

ACCESS ROAD PROFILES & DETAILS

LOWER SAUCON TWP. NORTHAMPTON CO.

PRELIMINARY / FINAL LAND DEVELOPMENT PLAN & SITE PLAN

Bethlehem Landfill Company

PENNSYLVANIA

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

PROJ. NO. 1162.4 | DWN. BY: DB | CHK. BY: RMB | DSN. BY: JM | SCALE: AS SHOWN

CADD FILE: 1162.4-LDP-14.dwg

DATE: 08/10/20

SCALE: AS SHOWN

DRAWING NO. 14 of 17

FILE: 1162.4 (NORTHERN EXPANSION) 1162.4-LDP-14.dwg

NEIGHBORHOOD PROTECTION ANALYSIS

(required per Zoning Ordinance Section 180-96)

PRIOR SUBMITTALS, NAMELY THE 2001 PHASE IV AND 2016 SOUTHEASTERN REALIGNMENT EXPANSION LAND DEVELOPMENT PLANS PROVIDED A NEIGHBORHOOD PROTECTION ANALYSIS ACCEPTED BY THE TOWNSHIP. THE ANALYSIS FOLLOWING PROVIDES AN UPDATE TO ONLY THOSE SECTIONS WHICH REQUIRE REVISION AS A RESULT OF THE NORTHERN REALIGNMENT. THOSE SECTIONS REVISED INCLUDE: HEAT, NOISE, & SMOKE, DUST, ECT. ALL OTHER SECTIONS INCLUDED ARE CONSISTENT WITH THE PREVIOUSLY FILED NEIGHBORHOOD PROTECTION ANALYSIS ON FILE WITH THE TOWNSHIP.

A. RADIOACTIVITY - THE ONLY USE OF EQUIPMENT WHICH EMITS RADIOACTIVITY IS THE OCCASIONAL USE OF A NUCLEAR SOIL DENSITY GAUGE DURING CONSTRUCTION INSPECTION ACTIVITIES. THE EQUIPMENT IS OPERATED ONLY BY A TECHNICIAN CERTIFIED TO USE THE EQUIPMENT. IT IS TRANSPORTED AND OPERATED IN ACCORDANCE WITH THE APPLICABLE REGULATIONS. WASTE CONTAINING RADIOACTIVE MATERIALS ABOVE E DEP NORM LEVELS IN THE FORM X IS NOT PERMITTED AT THE SITE. IF ANY WASTE DELIVERED IS SUSPECTED OF CONTAINING SUCH MATERIAL, THE WASTE WILL BE REJECTED PURSUANT TO THE LANDFILL'S WASTE ACCEPTANCE AND CLASSIFICATION PLAN AND FORM X. IF NECESSARY, EMERGENCY PROCEDURES WILL BE IMPLEMENTED SUCH AS CONTAINING THE ENVIRONMENTAL CLEANUP CONTRACTOR AS DESCRIBED IN THE BETHLEHEM LANDFILL PPC PLAN.

B. HEAT - THE ONLY HEAT SOURCE USED AT THE SITE OTHER THAN NORMAL BUILDIND AND VEHICLE HEATERS IS THE LANDFILL GAS FLARE USED TO SAFELY BURN LANDFILL GAS AS PART OF THE LANDFILL'S GAS CONTROL SYSTEM. THE FLARE IS LOCATED AT THE SOUTH CENTRAL PORTION OF THE SITE. IT IS LOCATED APPROXIMATELY 200 FEET FROM THE SOUTHERN PROPERTY LINE AND APPLEBUTTER ROAD. THE FLARE CAUSES NO MEASURABLE INCREASE IN TEMPERATURE AT E PROPERTY LINE. THE NORTHERN REALIGNMENT CAUSES NO CHANGES TO THE FLARE.

C. GLARE - NO WALKWAY OR PARKING AREA ILLUMINATION IS PROPOSED AT THIS TIME. IF SUCH LIGHTING IS INSTALLED IN THE FUTURE, IT WILL BE DONE IN ACCORDANCE WITH THE REQUIREMENTS OF THE ZONING ORDINANCE. IN THE WINTER MONTHS TEMPORARY LIGHTS ARE ROUTINELY USED ON THE WORKING FACE OF THE LANDFILL DURING OPERATIONAL HOURS BETWEEN 6 AM AND 6PM.

D. NOISE - THE LANDFILL RECEIVING HOURS FOR WASTE ARE FROM 7 AM TO 4 PM ON MONDAYS THRU SATURDAYS. THERE WILL BE NO RECEIVING HOURS ON SUNDAYS. SOME EQUIPMENT IS GENERALLY WORKING AT THE SITE FROM ABOUT 30 MINUTES BEFORE THE START OF THE RECEIVING HOURS TO ABOUT 2 HOURS AFTER THE END OF RECEIVING HOURS. THESE TIMES ALLOW FOR START UP AND WARMING OF EQUIPMENT AND PREPARATION OF THE WORKING FACE TO RECIEVE WASTES BEFORE RECEIVING HOURS AND COMPACTION OF COVERING OF WASTES AFTER THE END OF RECEIVING HOURS. THE TOWNSHIP ZONING ORDINANCE LISTS LIMITS FOR CONTINUOUS NOISE LEVELS AT THE PROPERTY LINE OF THE ADJACENT PROPERTIES BASED ON RECEIVING LAND USE. THE NEAREST NOISE RECEPTORS TO THE SITE ARE RESIDENTIAL AREAS TO THE SOUTHEAST. FOR RESIDENTIAL PROPERTIES THE LIMITS ARE 60 dBA FROM 7 AM TO 10 PM MONDAY THRU SATURDAY AND 50 dBA AT OTHER HOURS. THE LIMIT IS RE REDUCED BY 5 dBA FOR "PURE TONES". THE CURRENTLY APPROVED OPERATIONS PLAN FOR THE SITE LISTS THE EQUIPMENT USED FOR OPERATION OF THE FACILITY. THE LOUDEST OF THE EQUIPMENT WOULD BE DOZERS, LANDFILL COMPACTORS AND ARTICULATED TRUCKS. THESE OPERATE AT THE WORKING FACE AND ACCESS ROADS. THE ONLY SIGNIFICANT CONTINUOUS NOISE SOURCE IS THE OPERATION OF EQUIPMENT AT THE WORKING FACE. FOLLOWING ARE DATA FROM THE CATERPILLAR EQUIPMENT COMPANY ON THE NOISE LEVELS AT A DISTANCE OF 15 METERS OR (ABOUT 50 FEET) FROM THE EQUIPMENT.

NOISE LEVELS BASED ON OPERATING CONDITIONS AT A DISTANCE OF 15 METERS

FROM CATERPILLAR EQUIPMENT – dBA

	(1)	(2)	(3)	(4)	(5)
826 Compactor	80.0	79.3	74.5	79.8	83.0
836 Compactor	79.5	79.3	76.8	81.5	81.0
D4 Dozer	75.9	75.1	76.5	77.1	83.1
D8 Dozer	81.0	80.0	81.0	81.0	86.0
D350 Haul Truck	78.5	77.5	79.0	81.0	81.0

(1) = Engine at High Idle (max.)

(2) = Engine at Rated Speed

(3) = Engine Cycle (Idle-Max-Idle)

(4) = Hydraulic Cycle – Engine at Max.

(5) = Intermediate Gear Moving

TABLE #1

NOISE LEVELS MEASURED AT IESI BETHLEHEM LANDFILL - JANUARY 8, 2001

	(A)	(B) Noise Levels at 15 sec. Intervals at Location 50' from Main Access Road to Working Face - Start 9:35 AM		(C) Noise Levels at 15 sec. Intervals at Side of Applebutter Rd at Landfill Entrance - Start 9:50 AM		(D) Same as Previous Column Except Excluding 3 data Points Affected by Vehicles Entering Landfill	
DISTANCE FROM WORKING FACE (1)	TYPICAL SOUND PRESSURE LEVEL (dBA)	SOUND PRESSURE LEVEL (dBA)	SOUND PRESSURE (4)	SOUND PRESSURE LEVEL (dBA)	SOUND PRESSURE (4)	SOUND PRESSURE LEVEL (dBA)	SOUND PRESSURE (4)
		54.0	501.19	50.9	350.75	50.9	350.75
		56.0	630.96	51.5	375.84	51.5	375.84
		54.3	518.80	49.6	302.00	49.6	302.00
		58.5	841.40	64.0	1584.89	64.0	1584.89
		56.4	660.69	48.8	275.42	48.8	275.42
		53.6	478.63	48.8	275.42	48.8	275.42
		56.0	630.96	49.3	291.74	49.3	291.74
		58.3	822.24	71.3	3672.82	71.3	3672.82
		64.4	1659.59	49.8	309.03	49.8	309.03
		57.6	758.58	48.0	251.19	48.0	251.19
		55.8	616.60	47.6	239.88	47.6	239.88
		54.1	506.99	46.8	218.78	46.8	218.78
		53.8	489.78	63.1	1428.89	63.1	1428.89
		55.4	588.84	55.5	616.60		
		52.7	431.52	49.2	288.40	49.2	288.40
		52.4	416.87	49.1	285.10	49.1	285.10
		54.3	518.80	68.9	2786.12		
		53.5	473.15	61.0	1122.02		
		53.2	457.09	61.9	1244.51	61.9	1244.51
		57.9	785.24	55.3	582.10	55.3	582.10
		65.0	1778.28	60.0	1000.00	60.0	1000.00
		86.5	21134.89 (5)				
		63.8	1548.82				
		62.3	1303.17				
		54.9	555.90				
50'	87.0						
100'	70.5						
200'	64.0						
400' (2)	54.0						
550' (3)	51.5						
	AVERAGE	63.9	1584.36	58.4	833.41	57.2	720.93

NOTES:
(1) One compactor and one dozer spreading wastes with trucks delivering wastes about 9:10 to 9:25 AM
(2) Traffic noise from I-78 also audible at this location
(3) This point was across bench in slope so line of sight to working face no longer available; Working face noise not evident over other background noise (I-78 traffic in particular) except for scattered impact sounds and back-up alarms.
(4) Since dBA is a logarithmic scale, values are averaged using this column which is the Antilog (dBA/20).
(5) This high value caused by haul truck passing about 10' from meter.
EQUIPMENT USED - SPER SCIENTIFIC DIGITAL SOUND METER 840029
PERSONS PRESENT - Chuck Blough and Karen Christman - IESI, Allen O'Dell - Martin & Martin

THERE ARE NO NEARBY RESIDENTIAL PROPERTIES TO THE SOUTHEAST OR THE NORTH OF THE NORTHERN REALIGNMENT. SINCE THE WORKING FACE IS THE ONLY SIGNIFICANT CONTINUOUS NOISE SOURCE, DISTANCES FROM RESIDENTIAL PROPERTY LINES TO THE NEAREST WORKING FACE AREA OF THE NORTHERN REALIGNMENT ARE THE APPLICABLE SEPARATION DISTANCE. THE NEAREST RESIDENTIAL PROPERTY LINE TO THE SOUTHWEST IS ABOUT 900' FROM THE NEAREST NORTHERN REALIGNMENT WORKING FACE AREA AND THE DWELLING ITSELF IS 1000' AWAY FROM THE WORKING FACE. NOISE LEVELS AT THESES GREATER DISTANCES WERE NOT AVAILABLE FROM THE MANUFACTURE. BLC CONDUCTED NOISE LEVEL MEASUREMENTS AS LISTED ON TABLE 1 ON JANUARY 8, 2001 IN ORDER TO OBTAIN ACTUAL NOISE LEVELS AT THE DISTANCES FROM THE WORKING FACE EQUIPMENT, AT AN ACCESS ROAD AND ALONG APPLEBUTTER ROAD AT THE ENTRANCE.

DATA SET (A) ON TABLE 1 GIVES THE TYPICAL SOUND PRESSURE LEVELS AT VARIOUS DISTANCES FROM THE WORKING FACE. AT 300' THE INTERPOLATED NOISE LEVEL WAS 59 dBA. OPERATIONS FROM THE NORTHERN REALIGNMENT ARE GREATER THAN 300' TO A RESIDENTIAL PROPERTY LINE AND THE NOISE LEVEL OF ABOUT 59 dBA ID LOWER THAN THE ORDINANCE'S LIMIT OF 60 dBA. THE CLOSEST WORKING FACE OPERATIONS WILL BE ABOUT 1000' FROM THE NEAREST HOUSE. THE NOISE LEVEL AT THIS DISTANCE FROM THE WORKING FACE WAS LESS THAN 54 dBA WHICH IS ALSO LESS THAN THE ORDINANCE'S LIMIT OF 60 dBA. IT SHOULD BE NOTED THAT WORKING FACE OPERATIONS ASSOCIATED WITH THE NORTHERN REALIGNMENT ARE MORE REMOTE FROM RESIDENCES ALONG APPLEBUTTER ROAD THAN PREVIOUSLY APPROVED SECTIONS OF THE LANDFILL.

DATA SET (B) GIVES THE NOISE LEVEL AT A LOCATION 50' FROM THE MAIN ACCESS ROAD TO THE WORKING FACE WHERE TRUCKS ARE GOING UP OR DOWN A SIGNIFICANT GRADE. THESE DATA WERE OBTAINED AT A TIME WHERE DELIVERIES WERE NOT AT A PEAK RATE. HOWEVER THE AVERAGE LEVEL OBTAINED 50' FROM THE ACCESS ROAD (ABOUT 64 dBA) IS FAR LESS THAN THE 50' FROM THE WORKING FACE (ABOUT 87 dBA). THIS SHOWS THAT THE WORKING FACE IS THE MOST SIGNIFICANT SOURCE OF NOISE RATHER THAN THE ACCESS ROADS.

DATA SET (C) AND (D) GIVE NOISE LEVELS ALONG APPLEBUTTER ROAD, BOTH INCLUDING AND EXCLUDING LANDFILL RELATED TRAFFIC. THE AVERAGE NOISE LEVELS (57-58 DBA) WERE COMPARABLE TO NOISE LEVELS 300' FROM THE WORKING FACE AND EASILY EXCEEDED NOISE LEVEL 400' FROM THE WORKING FACE. THIS SHOWS MID-MORNING BACKGROUND NOISE LEVELS ALONG APPLEBUTTER ROAD ARE HIGHER THAN THE OFF-SITE NOISE LEVEL CAUSED BY WORKING FACE OPERATIONS.

E. SMOKE, DUST, ECT. - THE PROCEDURES USED TO CONTROL ODORS, METHANE GAS, DUST AND LITTER ARE DESCRIBED IN THE CURRENTLY APPROVED OPERATION PLAN FOR THE SITE. PREVAILING WIND DIRECTIONS ARE FROM THE SOUTHWEST, WEST AND NORTHWEST AS INDICATED IN FIGURE 1 WHICH IS A WIND ROSE FOR THE LEHIGH VALLEY AREA. THIS WOULD TEND TO CARRY DUST AND LITTER TO THE NORTHEAST, EAST AND SOUTHEAST OF THE SITE. IN THESE DIRECTIONS THE NEAREST PROPERTY LINE IS AT LEAST 200' FROM ANY NORTHERN REALIGNMENT DISPOSAL AREA WITH THE NEAREST RESIDENTIAL USE PROPERTIES OVER 900' AWAY.

F. VIBRATIONS - THE LANDFILL UTILIZES A VIBRATORY COMPACTOR WHEN NEEDED. THIS UNIT DOES NOT PRODUCE VIBRATIONS WHICH CAN BE FELT MORE THAN 100-200' AWAY. OPERATION OF THIS EQUIPMENT IN THE PAST HAS NOT CAUSED ANY CONCERNS. BLASTING IS NEEDED ON OCCASIONS TO FACILITATE ROCK REMOVAL FOR CONSTRUCTION OF LANDFILL CELLS. WHEN UTILIZED, AN OUTSIDE CONTRACTOR IS USED TO DO PRE- AND POST- BLAST SURVEYS, RECORD SEISMIC IMPACTS FROM THE BLAST AROUND THE BLAST ZONE AND MEASURE GOOD VIBRATIONS OFF THE SITE. THIS IS A NORMAL LANDFILL CONSTRUCTION ACTIVITY. IT IS NOT ANTICIPATED TO BE USED IN THE NORTHERN REALIGNMENT.

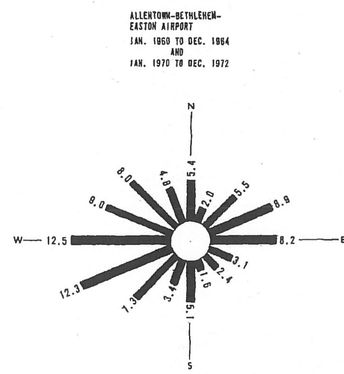
G. STORAGE OF HAZARDOUS AND TOXIC SUBSTANCES - THE LANDFILL DOES NOT STORE ANY OF THE SUBSTANCES LISTED IN SECTION 180-96G OF THE ZONING ORDINANCE OR SIMILAR HAZARDOUS AND TOXIC SUBSTANCES EXCEPT FOR HEATING OIL AND DIESEL FUEL. HEATING OIL TANKS ARE LOCATED IN AND AROUND THE OFFICE AND MAINTENANCE BUILDING. PROCEDURES FOR PREVENTION OF AND RESPONSE TO POTENTIAL SPILLS ARE DESCRIBED IN THE PPC PLAN FOR BETHLEHEM LANDFILL.

H. STORAGE OF CHEMICALS - THERE IS NO UNDERGROUND STORAGE OF CHEMICALS. WASTE OIL AND ANTI-FREEZE IS STORED IN 55 GALLON DRUMS IN THE MAINTENANCE BUILDING UNTIL THEY ARE TAKEN OFF-SITE FOR RECYCLING. THESE ITEMS, SHOP CHEMICALS, CLEANING CHEMICALS, AND 5-GALLON CONTAINERS OF GASOLINE FOR FOR SMALL POWER EQUIPMENT ARE STORED IN THE EXISTING OFFICE AND MAINTENANCE BUILDINGS. ALL OF THESE BUILDINGS ARE LOCATED MORE THAN 300' AWAY FROM ANY RESIDENTIAL DWELLING OR RESIDENTIAL DISTRICT BOUNDARY. SPILL PREVENTION AND RESPONSE PROCEDURES ARE DESCRIBED IN THE PPC PLAN FOR BETHLEHEM LANDFILL.

I. STORAGE OF WASTES - WASTES DELIVERED TO THE SITE FOR DISPOSAL ARE COMPACTED DAILY. ROLLOFF CONTAINERS SHALL BE PROVIDED AT THE EXISTING "DROP-OFF" AREA FOR THE RECYCLABLES AND SOLID WASTE FROM SMALL VEHICLES. THE RECYCLABLES ARE HAULED OFF-SITE FOR RECYCLING AS NEEDED, THE WASTE CONTAINERS ARE HAULED TO THE WORKING FACE AS NEEDED WHICH IS USUALLY EVERY 1-2 DAYS.

J. OTHER - OTHER ENVIRONMENTAL IMPACTS AND CONTROL MEASURES ARE DESCRIBED IN FORM D OF THE DEP PERMIT APPLICATION AS WELL AS OTHER SECTIONS OF THE PERMIT APPLICATION.

WIND ROSE FOR THE LEHIGH VALLEY REGION



NOTE: NUMBERS EXPRESS FREQUENCY OF OCCURRENCE IN PERCENT.

COMMONWEALTH OF PENNSYLVANIA — JOSEPH M. MARTIN, JR. — REGISTERED PROFESSIONAL ENGINEER — 049262E

NO.	REVISION	DATE
1	AS PER 08/17/20 HANOVER REV. LETTER	10/29/20

NEIGHBORHOOD PROTECTION ANALYSIS

LOWER SAUCON TWP. — NORTHAMPTON CO.

PRELIMINARY / FINAL LAND DEVELOPMENT PLAN & SITE PLAN

Bethlehem Landfill Company

PENNSYLVANIA

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

PROJ. NO. 1162.4 | DWN. BY: DB | CHK. BY: RMB | DSN. BY: JM

SCALE: AS NOTED

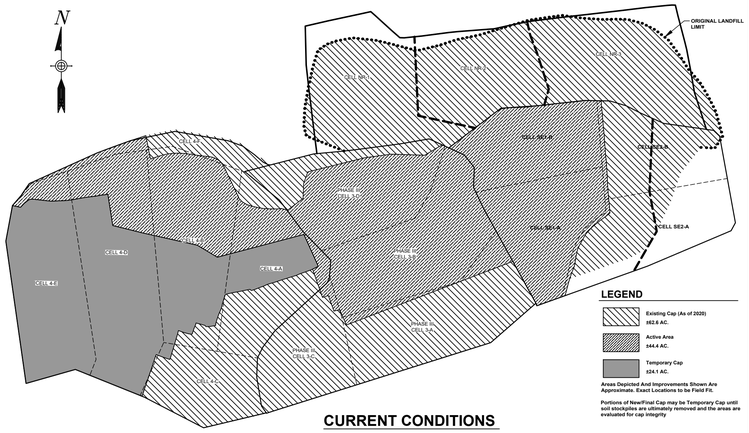
CADD FILE: 1162.4-LDP-15.dwg

DATE: 08/10/20

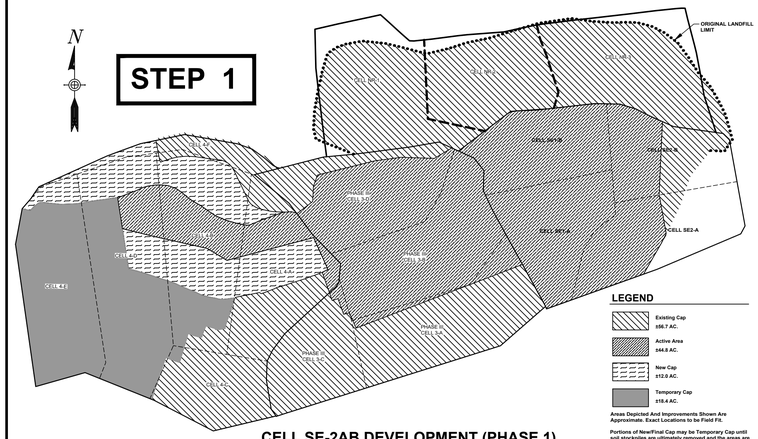
SCALE: AS NOTED

DRAWING NO. **15 of 17**

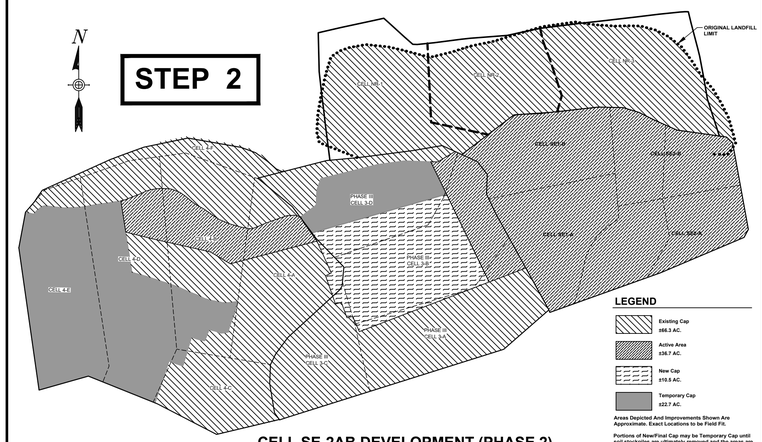
FILE: 1162.4 (NORTHERN EXPANSION) 1162.4-LDP-15.dwg



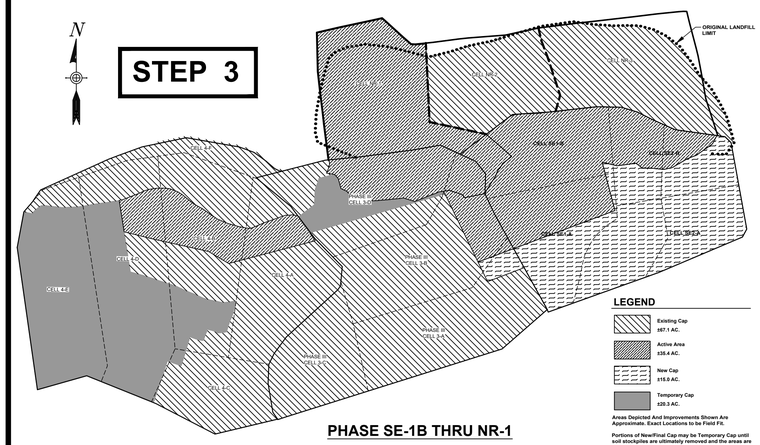
CURRENT CONDITIONS



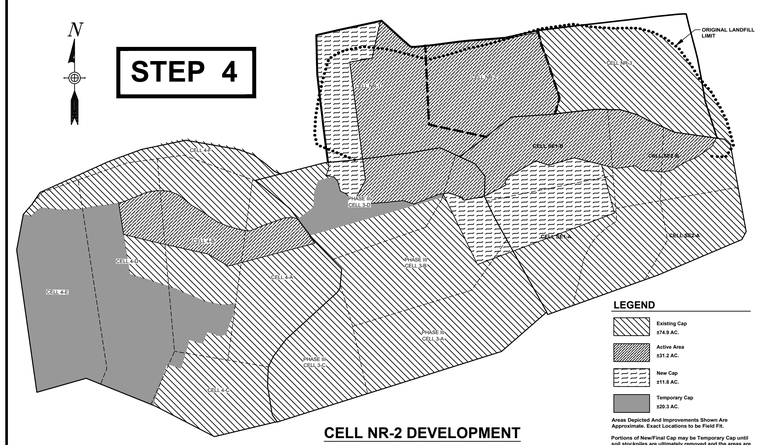
CELL SE-2AB DEVELOPMENT (PHASE 1)



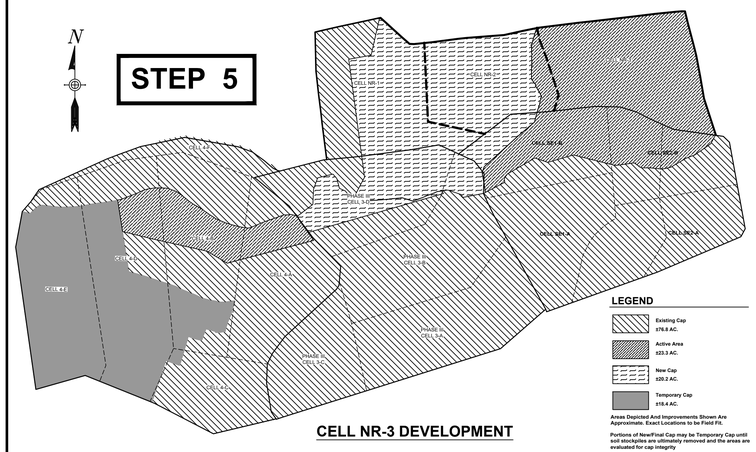
CELL SE-2AB DEVELOPMENT (PHASE 2)



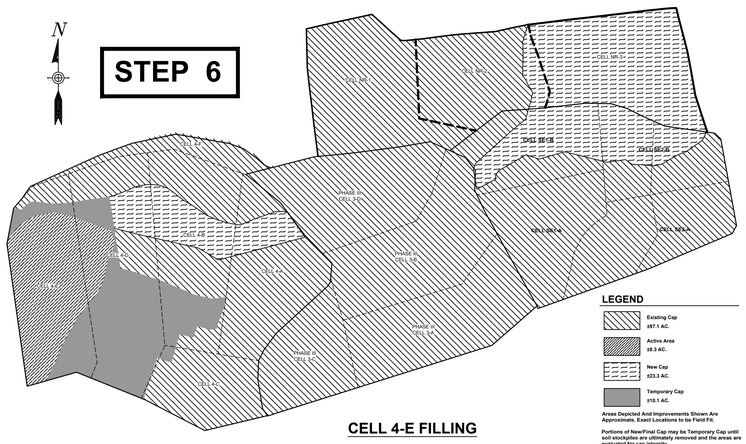
PHASE SE-1B THRU NR-1



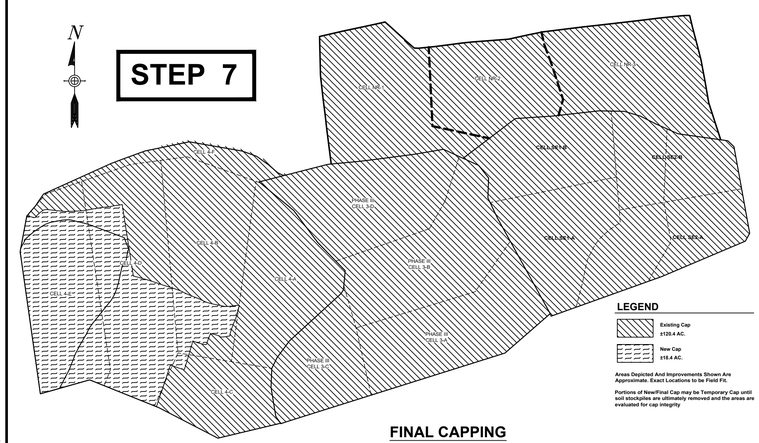
CELL NR-2 DEVELOPMENT



CELL NR-3 DEVELOPMENT

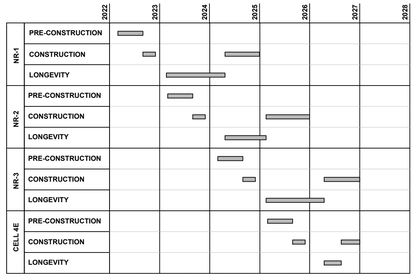


CELL 4-E FILLING



FINAL CAPPING

LANDFILL TIME LINE
YEARS



PRE-CONSTRUCTION : CONSTRUCTION INCLUDES STORMWATER AND EROSION & SEDIMENTATION CONTROL FACILITIES & EXCAVATION TO SUBGRADE.
CONSTRUCTION : CONSTRUCTION INCLUDES SUBBASE, SECONDARY LINER, LEACHATE DETECTION ZONE, PRIMARY LINER, PROTECTIVE COVER & LEACHATE COLLECTION SYSTEM, CAPPING.
LONGEVITY : LIFE EXPECTANCY OF CELL / SITE.

AREAS

CELL No.	AREA (Ac.)
NR-1	10.4 Ac.
NR-2	7.7 Ac.
NR-3	10.6 Ac.
CELL 4E	2.9 Ac.
Totals:	28.7

LONGEVITY (MONTHS)

CELL	EACH CELL	CUMULATIVE
NR-1	14.0	14.0
NR-2	9.8	23.8
NR-3	13.9	37.7
CELL 4E	4.1	41.8
		YEARS = 3.5

1. Cell NR-1, NR-2 and NR-3 Longevity Assumes: 1,375 Tons/Day , 312 Days/Year, 26 Days/Month at a Minimum VCF of 0.75

2. Gross Airspace is Volume Between Bottom of Subbase to Final Grade (Bottom of Membrane Cap)

COMMONWEALTH OF PENNSYLVANIA JOSEPH M. MARTIN REGISTERED PROFESSIONAL ENGINEER No. 027766 E

NO.	REVISION	DATE
1	AS PER 09/17/20 HANOVER REV. LETTER	10/29/20

CELL DEVELOPMENT SCHEDULE

PRELIMINARY / FINAL LAND DEVELOPMENT PLAN & SITE PLAN

Bethlehem Landfill Company

LOWER SAUCON TWP. NORTHAMPTON CO. PENNSYLVANIA

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

SCALE: 400' 200' 0 400' 800' Scale: 1" = 400'

PROJ. NO.	DWN. BY:	CHK. BY:
1162.4	DB	JM
DSN. BY:		
JM		

CADD FILE: 1162.4-LDP-16.dwg

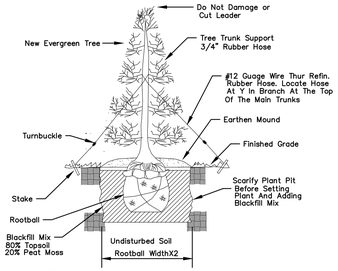
DATE: 08/10/20

SCALE: 1" = 400'

DRAWING NO.

16 of 17

FILE: 1162.4 (NORTHERN EXPANSION) 1162.4-LDP-16.dwg



NOTES:

1) This Method Is To Be Used On All 4' 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./Cu. 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

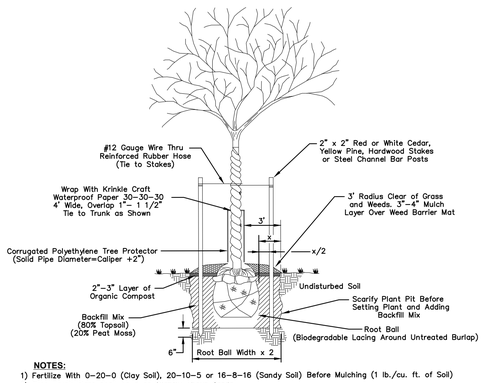
N.T.S.

NOTES:

1) Do Not Prune Evergreens Except to Remove Dead or Broken Branches.
2) Thin Branches and Foliage (Not All 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.



NOTES:

1) Fertilize With 0-20-0 (Clay Soil), 20-10-5 or 16-8-16 (Sandy Soil) Before Mulching (1 lb./cu. ft. of Soil)
2) Tree Trunk Flare shall be a 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

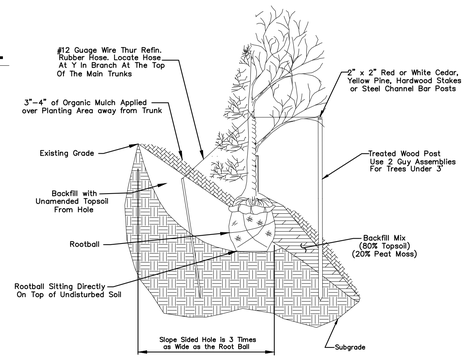
N.T.S.

STREET TREE NOTES & CALCULATIONS

1. AS DEPICTED HEREIN, THE NORTHERN REALIGNMENT PROPOSES NO IMPACT TO EXISTING TREES AND VEGETATION ALONG THE APPLEBUTTER ROAD AND SKYLINE DRIVE RIGHTS-OF-WAY.
2. THE TOTAL LENGTH OF ROADWAY FRONTAGE (APPLEBUTTER ROAD) FOR THE BETHLEHEM LANDFILL PROPERTY IS 3,000 FEET. SECTION 145-52.B OF THE SUBDIVISION AND LAND DEVELOPMENT ORDINANCE WOULD REQUIRE THE PLANTING OF ONE (1) STREET TREE FOR EVERY 100 FEET OF ROADWAY FRONTAGE (FOR A TOTAL OF 30 STREET TREES), IF EXISTING TREES ALONG APPLEBUTTER ROAD WERE NOT RETAINED. THE EXISTING TREES AND VEGETATION ALONG APPLEBUTTER ROAD THAT ARE BEING RETAINED EXCEED THE 30 STREET TREES THAT WOULD BE REQUIRED UNDER SECTION 145-52.B OF THE SUBDIVISION AND LAND DEVELOPMENT ORDINANCE.
3. THE TOTAL LENGTH OF ROADWAY FRONTAGE (SKYLINE DRIVE) FOR THE BETHLEHEM LANDFILL PROPERTY IS 500 FEET. SECTION 145-52.B OF THE SUBDIVISION AND LAND DEVELOPMENT ORDINANCE WOULD REQUIRE THE PLANTING OF ONE (1) STREET TREE FOR EVERY 100 FEET OF ROADWAY FRONTAGE (FOR A TOTAL OF 5 STREET 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 SUBDIVISION AND LAND DEVELOPMENT ORDINANCE.

STEEP SLOPE TREE PLANTING DETAIL

N.T.S.



LANDSCAPING NOTES:

SITE LANDSCAPING

THE EXISTING IMPERVIOUS SURFACE WITHIN THE SUBJECT PROPERTY IS 13.0 AC. THE NORTHERN REALIGNMENT PROPOSES AN ADDITIONAL 1.86 AC. OR 81,022 S.F. OF NEW IMPERVIOUS SURFACE AS REQUIRED BY ORDINANCE ONE TREE FOR EACH 500 S.F. OF NEW IMPERVIOUS SURFACE IS REQUIRED. THUS 162 TREES ARE REQUIRED. AS SHOWN ON THE LANDSCAPING PLANS. 162 TREES ARE PROPOSED.

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 SPRING OATS (96 lbs/ac), WINTER WHEAT (120 lbs/ac), OR WINTER RYE (112 lbs/ac). THE BASE MIXTURE SHALL BE AUGMENTED WITH BIRDSFOOT TREFOIL (10 lbs/ac), TALL FESCUE (35 lbs/ac), AND REDTOP (3 lbs/ac).

INSTALLATION AND MAINTENANCE

ALL PLANTING MATERIALS REQUIRED SHALL BE FURNISHED BY BLC, INSTALLED IN A GOOD WORKMANSHIP LIKE MANNER AND IN ACCORDANCE WITH ACCEPTED AND GOOD PLANTING PROCEDURES, AND MAINTAINED BY BLC IN ACCORDANCE WITH ANSI STANDARDS. PLANTINGS SHALL BE OF HEALTHY STOCK AND SHALL BE WATERED REGULARLY BY BLC AND IN A MANNER APPROPRIATE FOR THE SPECIFIC PLANT SPECIES THROUGH THE FIRST GROWING SEASON. DEAD AND DYING LANDSCAPING SHALL BE REPLACED BY BLC TO THE SATISFACTION OF THE TOWNSHIP MANAGER OR OTHER TOWNSHIP OFFICIAL DESIGNATED BY TOWNSHIP COUNCIL, DURING THE NEXT GROWING SEASON. NO BUILDINGS, STRUCTURES, STORAGE OF MATERIALS, OR PARKING SHALL BE PERMITTED WITHIN THE PLANTING SCREEN AREA. THE PLANTING SCREEN AREA SHALL BE MAINTAINED BY BLC 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 BLC.

GUYING AND STAKING

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

MULCHING

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

TREES REQUIRED FOR PROPOSED IMPERVIOUS AREA

PROPOSED IMPERVIOUS AREA	# OF REQUIRED TREES (1 PER 500 S.F. IMPERVIOUS)	# OF PROPOSED TREES
1.86 ACRES OR 81,022 S.F.	162	162

PLANT SCHEDULE

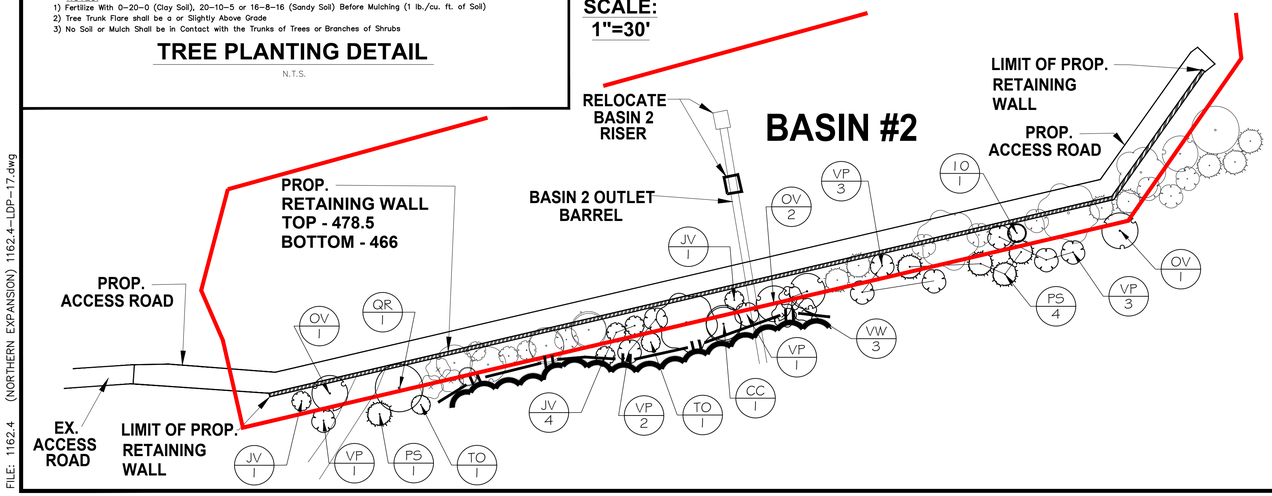
TREES	QTY	BOTANICAL NAME / COMMON NAME	CONT
CC	27	Cercis canadensis / Eastern Redbud Multi-trunk	1 1/2" Caliper B&B
IO	36	Ilex opaca / American Holly	5' B&B
JV	69	Juniperus virginiana / Eastern Red Cedar	5' Ht. Container
OV	30	Ostrya virginiana / American Hophornbeam	1 1/2" Caliper B&B

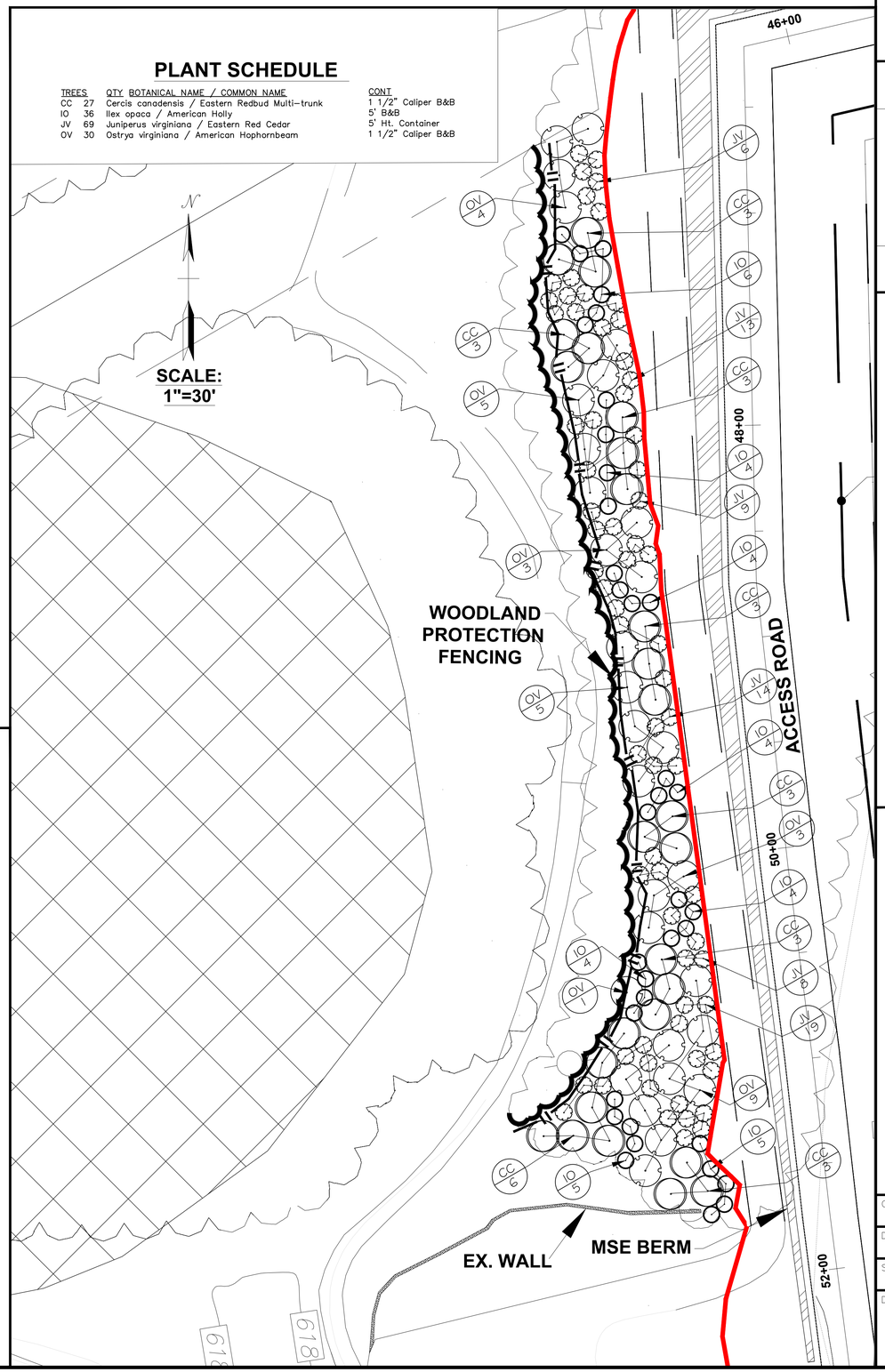
PLANTINGS TO BE RELOCATED ALONG BASIN #2

TREES	QTY	BOTANICAL NAME / COMMON NAME	CONT
CC	1	Cercis canadensis / Eastern Redbud Multi-trunk	1 1/2" Caliper B&B
IO	1	Ilex opaca / American Holly	5' B&B
JV	6	Juniperus virginiana / Eastern Red Cedar	5' Ht. Container
OV	4	Ostrya virginiana / American Hophornbeam	1 1/2" Caliper B&B
PS	5	Pinus strobus / White Pine	5' Ht. B&B
TO	2	Thuja occidentalis / Eastern Cedar	5' Ht. B&B
QR	1	Quercus rubra / Red Oak	1 1/2" Caliper B&B

SHRUBS	QTY	BOTANICAL NAME / COMMON NAME	SIZE
VW	3	Viburnum cassinoides / Witherod Viburnum	36" Ht Cont.
VP	10	Viburnum prunifolium / Blackhaw Viburnum	36" Ht Cont.

SCALE: 1"=30'





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

NO.	REVISION	DATE
1	AS PER 09/17/20 HANOVER REV. LETTER	10/29/20

LANDSCAPING NOTES & DETAILS

PRELIMINARY / FINAL LAND DEVELOPMENT PLAN & SITE PLAN

LOWER SAUCON TWP. NORTHAMPTON CO. PENNSYLVANIA

Bethlehem Landfill Company

PROJ. NO. 1162.4 | DWN. BY: DB | SCALE: 30" 15" 0 30" 60" Scale: 1" = 30'
DSN. BY: JM | CHK. BY: RMB

CADD FILE: 1162.4-LDP-17,18.dwg

DATE: 08/10/20

SCALE: 1" = 30'

DRAWING NO.

17 of 17

FILE: 1162.4 (NORTHERN EXPANSION) 1162.4-LDP-17.dwg

BETHLEHEM LANDFILL COMPANY

Northern Realignment

LAND DEVELOPMENT PLAN SUPPORTING DOCUMENTATION

Volume 2 of 2

August 2020
Revised October 29, 2020

Prepared by:
Martin and Martin, Incorporated
37 South Main Street, Suite A
Chambersburg, PA 17201
Phone: 717.264.6759
Fax: 717.264.7339
Website: martinandmartininc.com

Bethlehem Landfill Company (BLC)
Northern Realignment

LAND DEVELOPMENT PLAN SUPPORTING DOCUMENTATION

August 2020
Revised 10/29/2020

TABLE OF CONTENTS

SECTION 10
Post Construction Stormwater Management Plan Narrative

NORTHERN REALIGNMENT

BETHLEHEM LANDFILL COMPANY

"Post Construction Stormwater Management Report"

Lower Saucon Township — Northampton County

Pennsylvania

August 2020
Revised October 2020

Prepared for:
Bethlehem Landfill Company
2335 Applebutter Road
Bethlehem, PA 18015

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

NORTHERN REALIGNMENT

BETHLEHEM LANDFILL COMPANY

"Post Construction Stormwater Management Report"

Lower Saucon Township Northampton County

Pennsylvania

TABLE OF CONTENTS

Appendices

1.0 Introduction

This Stormwater Management Plan is submitted on behalf of Bethlehem Landfill Company for the development of the Northern Realignment at the Bethlehem Landfill. The project is proposed to be constructed within the existing landfill permit boundary on the +/-224 acre property in Lower Saucon Township, Northampton County. The area of development includes +/-49 acres of disturbance of which only 7.28 acres will impact upon current undeveloped lands. All other areas of the proposed Northern Realignment are located within previously approved development areas for landfill or landfill support operations.

Stormwater runoff from the project site will be managed during and following construction through the implementation of various controls and Best Management Practices (BMPs). Those BMPs to be utilized during construction are illustrated on the Erosion and Sediment Control Plans while the BMPs to be utilized following construction are illustrated and described on the Land Development and Post Construction Stormwater Plans. Similarly the design computations for the BMPs to be utilized during construction are contained within the Erosion and Sediment Control Plan Narrative (Form I) and the post construction BMP design computations are contained herein.

Pursuant to Map 8 of the Watershed Management Plan titled "Release Rates – Saucon Creek Watershed" the Bethlehem Landfill appears to be located within Sub-Areas 188, 189 and 196. Multiple reports and design computations have been prepared and approved for various phases of development associated with the Bethlehem Landfill. The first such phase of development to our knowledge which was subject to the release rates prescribed in the Chapter 167 Saucon Creek Watershed Study was Phase III. Thus, for the purposes of this report we conclude the release rates previously approved for each BMP (Detention Basin) drainage shed are the required maximum release rates which must be met upon development of the Northern Realignment. Those rates which we consider as pre-development rates for each existing drainage sheds onsite are as follows:

Table 1.0 Pre-Development Release Rates for Bethlehem Landfill Drainage Areas (in cubic feet per second)				
Drainage Area	**DESIGN STORM EVENT**			
	2 yr/24 hr	**10 yr/24 hr**	**25 yr/24 hr**	**100 yr/24 hr**
Basin #1*			1.43	
Basin #2**	0.3	1.2	1.6	13.1
Basin #3**	9.5	22.8	31.0	44.3
Basin #4*	3.1	6.7	8.3	10.6
Basin #6**	9.0	20.4	27.1	37.5

*** Obtained from Phase III Form I Document (1993)**

**** Obtained from Phase IV Stormwater and E&S Control Plan Form I Document (2003)**

Basin #1 was modified in 2019. The proposed development within the Basin #1 drainage shed slightly increased the drainage area of Basin #1 to 23.04 acres. Prior to that, since Basin #1's original development in the 1990's it has not been altered or modified. Rather with each subsequent phase of development after Phase IV the drainage shed to Basin #1 has been reduced from its prior peak (23.02 ac.) associated with the Phase IV approval (see Exhibit #1 within Appendix C). Therefore, the last analysis of Basin #1 was performed in association with Phase III and thus this is what is provided as "pre-development" for Basin #1.

The drainage areas associated with Basins #2 & #4 were analyzed initially during the Phase III development. Further analysis namely extrapolation of discharge rates for the 2, 10 and 100 year events occurred associated with the Phase IV Stormwater Management Plan which rates are outlined within Table 1.0.

The drainage areas associated with Basins #3 & #6 were analyzed during the development of Phase IV as undeveloped areas without BMPs.

The discharge rates outlined within Table 1.0 are the approved discharge rates for each basin accounting for the release rate criteria outlined within the Saucon Creek Act 167 Plan.

2.0 Post Construction Stormwater Management Design Objectives

The objectives of this Post Construction Stormwater Management Plan are as follows:

- To comply with the Lower Saucon Township standards for stormwater management contained within Chapter 137 of the Lower Saucon Township Code.
- To comply with the Lower Saucon Township Subdivision and Land Development Ordinance Chapter 145 of the Lower Saucon Township Code, as applicable.
- To comply with the whole of 25 Pa. Code Chapter 102.

3.0 Site Description

The subject +/-224 acre property is an active landfill and as such grades within the site change on a daily basis. Additionally, since the 1980's various Stormwater and Erosion and Sediment Control Plans have been prepared for the site as the landfill operations have expanded. Therefore, for the purposes of pre-development conditions appropriate sections of previous reports have been included herein to document the release rates as outlined in Table 1.0. Pre-development drainage area mapping was taken from the latest approved drainage plan for the site. Historical mapping has also been provided for documentation of past design criteria for each drainage basin within Appendix C.

The latest approved drainage plan utilized as pre-development mapping manages stormwater runoff by utilization of several detention basins throughout the site, five (5) in total. All stormwater basins are designed to collect runoff from the landfill development via a series of channels and culverts for management. Upon detention within the approved basins the runoff is released at rates equal to or less than previously approved to be in compliance with Township and Act 167 requirements. Thus if post development discharge rates resulting from development of the Northern Realignment from basins are less than the approved basin release rates (Table 1.0) compliance with the Ordinance and the Act 167 Plan is achieved regarding rate control.

A NPDES Permit for Stormwater Discharges Associated with Industrial Activities is maintained as part of the landfill operation. The permit includes as discharges from the site each basin outfall. The discharges are tributary to unnamed tributaries of the East Branch of Saucon Creek which is classified as TSF in Chapter 93. The pre-development drainage area analysis is consistent with the latest approved drainage plan (Aria Energy RNG Facility Stormwater Plan).

According to Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map Number 42095C0335E Panel 0335E, no portion of the 224 acre property is located in a mapped floodplain. Appendix A contains a USGS 7.5-minute series location map and a FEMA National Flood Insurance Program Flood Insurance Rate Map of the project area.

Existing points of discharge as defined within the PAG-03 General NPDES Permit for Bethlehem Landfill will be relocated as development of the Northern Realignment progresses.

As outlined on the Act 167 mapping contained within Appendix A the subject site is located within Several Stormwater Management Districts. Those districts are sub-areas 188, 189 and 196. Sub-areas 189 and 196 are classified as 100% release rate districts while 188 is a dual release rate district (30/50). Discharges from Basins #1, #3, #4 and #6 are located within districts 189 and 196 while Basin #2 is located in district 188. As stated previously the prescribed discharge rates (Table 1.0) have been obtained from previous analysis. Specifically, Basin #2 was first analyzed in 1993 and the discharge rates utilized herein were calculated with the management structure (Basin #2) in place. Thus, the rates outlined already account for the dual release rate required.

4.0 Soils Classifications

Soils classifications were obtained from the Natural Resource Conservation Service National Cooperative Soil Survey (Web Soil Survey) Website. According to NRCS no hydrologic group is exclusive to the site. Developed landfill areas are considered Group "B" while those undeveloped areas are considered "A". Hydric soils are not present within the project area. The following table is a listing of the soil types occurring at the site. NRCS Soil Classification Maps and Soils reports are attached in Appendix B.

Table 4.0 - Soils

Map Symbol	Name	Hydrologic Soil Group
CaB	Califon Loam, 3 to 8 percent slopes	D
GIB	Gladstone Gravelly Loam, 3 to 8 percent slopes	A
GIC	Gladstone Gravelly Loam, 8 to 15 percent slopes	A
GmF	Gladstone Gravelly Loam, 25 to 55 percent slopes	A
GnD	Gladstone-Parker Gravelly Loam, 15 to 25 percent slopes	A
UfB	Udorthents, Sanitary Landfill	B
UupB	Urban Land – Udorthents, 0 to 8 percent slopes	C

As outlined in the table above the existing landfill areas are defined by NRCS as being of the Hydrologic Soil Group B. Thus, for analysis of rate control all areas which have been approved for landfill or landfill support activities have been considered as part of the Hydrologic Soil Group B.

Additionally, given the slopes which exist in the areas currently undeveloped, we conclude that while NRCS identifies these soils as in Hydrologic Soil Group "A" the soils in these areas would be better accounted for as it relates to curve number calculation to be considered as part of Hydrologic Soil Group "B". Thus, for the purposes of rate calculation all soils onsite have been considered as part of Hydrologic Soils Group "B". We note proposed development is outside those areas defined as Urban Lands being part of Soil Group C as well as those mapped as part of hydrologic soil group "D".

5.0 Geotechnical Investigation and Infiltration Analysis

An extensive geotechnical study and investigation has been performed for the site as part of the PaDEP Municipal Solid Waste Application which has been provided to the Township. The geotechnical study is provided as a separate document to this report. In general the geotechnical study concludes the landfill including the Northern Realignment is not underlain with carbonate geology.

Section 137-15 L prohibits the use of infiltration BMPs on "hot spot" land use areas. Section 137-15 K provides a listing of "hot spot" land uses which includes certain industrial uses regulated under the NPDES Stormwater Program. The Bethlehem Landfill is regulated under the NPDES Stormwater Program. A NPDES Permit is maintained onsite which monitors all offsite discharge points. Therefore, based upon Chapter 137 of the Lower Saucon Code the subject property is considered a "hot spot" land use and infiltration BMPs are prohibited. We concur with this approach in that discharges/infiltration of runoff from the landfill industrial use has the potential to result in groundwater contamination. Based upon the above no infiltration testing nor geologic assessment was performed onsite to determine the suitability of the site for infiltration given its prohibition. Further no recharge volume, loading ratio or other calculations or evaluations were performed as prescribed in Section 135-16 since this section is not applicable to the project.

6.0 Methods of Analysis and Design

6.1 Watershed Analyses

Contained within the Bethlehem Landfill there currently exists six (6) watersheds. Watersheds are as follows:

1. Basin 1
2. Basin 2
3. Basin 3
4. Basin 4
5. Basin 6
6. Lehigh River

These drainage sheds have been analyzed numerous times as the landfill has expanded over time. Historical mapping with each drainage shed can be found within Appendix C. The Northern Realignment proposes development within the watershed of Basin #2. The proposed development results in an increase in the Basin #2 drainage area and a corresponding decrease in the Lehigh River Drainage Shed. Given the watersheds as previously approved met release rate criteria and development is consistent with previous designs, then the watersheds not impacted by the Northern Realignment, by remaining unchanged, will continue to meet release rate criteria. For the purposes of post development analysis the following post development calculations are provide herein.

Basin #1	-	Aria Energy RNG Facility Post Development Calculations
Basin #2	-	New Analysis as Described Herein
Basin #3	-	Phase IV Post Development Computations
Basin #4	-	Cell 4F Minor Modification Post Development Computations
Basin #6	-	Cell 4F Minor Modification Post Development Computations
Area A	-	Southeastern Realignment Post Development Computations

Basin 2 however has an increased drainage area as a result of development and thus requires further analysis. Peak Runoff Analyses were performed using the soil cover complex method within the SEDCAD 4 computer program. Drainage Area Mapping specific to Basin 2 is contained within Appendix D. Comprehensive Watershed Analyses are provided in Appendix G and H. For reference we have also included pre-development and post development historical computations for each watershed.

6.2 Rainfall Depths

Rainfall depths (24-hr) were obtained from Appendix "C", Chapter 137 of the Lower Saucon Township Code as follows:

1 year	=	2.40"
2 year	=	3.00"
5 year	=	3.60"
10 year	=	4.56"
25 year	=	5.52"
50 year	=	6.48"
100 year	=	7.44"

6.3 Runoff Curve Numbers

Runoff curve numbers were obtained from Chapter 137 Appendix C of the Lower Saucon Township Code. A discussion regarding runoff curve number calculations can be found within Appendix F as well as weighted runoff curve number calculations.

6.4 Times of Concentration (T_c)

Times of concentration were calculated using a segmental approach based on flow characteristics approximated through interpretation of existing and proposed topography and ground surface coverage. Time of concentration calculations is located in Appendix E. T_c paths are depicted on the drainage area maps are provided in Appendix D.

6.5 Stormwater Detention Basin

Basin #2 has been re-designed for peak rate control and a water quality BMP. Basin #2 receives the vast majority of runoff from the Northern Realignment development area. Peak runoff from the onsite contributory drainage areas was routed through the detention basin under post construction conditions to confirm adequate discharge attenuation from the site. The design of this facility accounts for all of the site conditions, constraints and design considerations as outlined within the Pa Stormwater BMP Manual.

Calculations in Appendix I include water quality treatment and dewatering times. Construction details are provided on the Post Construction Stormwater Management Plans.

6.6 Stormwater Channels

Stormwater channels were designed to convey peak runoff generated during a 100-year design storm as derived using the Soil Cover Complex Method within SEDCAD 4 for calculating stormwater runoff. Channel linings were selected based on the governing condition of flow velocity or shear stress occurring when conveying the design peak flow. All calculations pertaining to channel design are located in Appendix J. Stormwater facility drainage area maps are located in Appendix D for reference.

6.7 Stormwater Culverts

Stormwater culverts were designed to convey peak runoff generated during a 100-year design storm as derived using the Soil Cover Complex Method within SEDCAD 4 for calculating stormwater runoff. Manning's Equation within SedCAD 4 program was used to model the hydraulics of the stormsewer system. All calculations for culvert design are located in Appendix K.

7.0 Pre Construction Peak Runoff Analysis (Basin #2)

Pre-construction peak runoff volume and peak discharge was analyzed at one point of interest (POI). POI-1 is located at the outfall of existing Basin 2. As stated previously Basin 2 was most recently redesigned as part of the Southeaster Realignment. However, computations from Phase III development have been used as pre-development conditions for peak rate of discharge. Peak runoff rate was calculated at the point of interest for the two (2), ten (10), twenty-five (25), and one-hundred (100) year storm events. Pre-construction hydrograph summaries and detailed hydrographs are provided in Appendix G of this report. A pre-construction drainage area map is included within Appendix D. The following table is a summary of existing peak discharges from the project site.

Table 7.0 – Pre-construction Peak Discharge Summary

In Cubic Feet per Second

Design Storm Event	POI-1 (Basin 2)
2-year	0.30
10-year	1.20
25-year	1.60
100-year	13.10

The pre-development release rates for Basin 2 outlined above are considerably less, in our view, than what would be expected from a "True" pre-existing landfill and Basin 2 condition. A search through volumes of analysis did not reveal any analysis performed prior to the landfill and Basin #2 development. Thus, this report and past reports have relied upon the basin discharge rates from previous reports as the required release rate. These are the values reflected within Table 7.0.

8.0 Post Construction Peak Rate Management

Post construction peak runoff was calculated for the same point of interest examined in the pre-construction analysis, thus a direct comparison is made. A post construction drainage area map is included within Appendix D. Peak runoff rates were calculated for the two (2), ten (10), twenty-five (25), and one-hundred (100) year storm events. Post construction peak discharge rates will be managed through the construction of a stormwater detention basin to minimize the rate of surface runoff discharged from the project area. Additionally, post construction computations for each drainage area (basin) onsite has been provided as referenced in Section 6.1.

The following table is a summary of proposed post construction peak discharges with stormwater management controls compared to pre-construction discharges for each drainage shed. Post construction hydrograph summaries, detailed rational hydrographs and routing hydrographs are provided in Appendix H.

Table 8.0 – Post Construction Peak Discharge Summary

In Cubic Feet per Second – with Stormwater Controls

Design Storm Event	DESIGN STORM EVENT (CFS)							
	2 yr/24 hr		10 yr/24 hr		25 yr/24 hr		100 yr/24 hr	
	PRE	POST	PRE	POST	PRE	POST	PRE	POST
Basin #1					1.43	1.43		
Basin #2	0.30	0.28	1.23	1.21	1.61	1.60	13.1	11.62
Basin #3	9.5	0.59	22.8	5.19	31.0	8.25	44.3	12.18
Basin #4	3.1	1.85	6.7	5.54	8.3	8.15	10.6	10.49
Basin #6	9.0		20.4		27.1	7.38	37.5	10.56
Area A	0.23	0.20	2.14	1.91	3.89	3.48	8.22	7.36

As evidenced by the results presented above, post construction peak discharge rates will be equal to or less than pre-construction peak discharge rates for all storm events analyzed. Thus, since the pre-development approved rates account for required release rates meeting Act 167 the proposed development meets or exceeds the requirement as it relates to rate control.

Rev. 9/2020
Rev. 10/2020

9.0 Post Construction Water Quality Analysis

As shown on the land cover plans provided in Appendix L for Pre and Post Development, The area of development associated with the Northern Realignment is 48.93 acres. Current conditions yield this area of development to include Woodlands, Grass Cover and Impervious Area. The vast majority of this development area consists of previously developed landfill and support activities. Upon development of the Northern Realignment the area of impact to land cover not currently approved as landfill or landfill support activities change is limited to 7.28 acres. The proposed land cover within this area will be grass and impervious surface. Based upon this change in natural land cover the Water Quality Volume can be calculated in accordance with Ordinance requirements as follows:

Where:

c = Rational Method Post Development Coeff - 2yr Storm

$$c = \frac{(0.30)(0.24\ Ac.)+(0.43)(3.18\ Ac.) + (0.97)(3.86\ Ac.)}{7.28}$$

Where: 3.86 Ac. is impervious (0.97) and
0.24 Ac. is meadow/lawn "good" (0.30)
3.18 Ac. is meadow/lawn "poor" (0.43)

c = 0.71

P = 1.25 inches

A = Area of Prop. New Activity or Land Cover Change (7.28 ac.)

1.) $$WQv = \frac{(c)(P)(A)}{12}$$

$$WQv = \frac{(0.71)(1.25\ in.)\ (7.28\ Ac.)}{12}$$

WQv = 0.54 ac-ft or 23,522 cf

Thus as shown above utilizing calculation methodology #1 the Water Quality Volume is calculated as 0.54 ac-ft or 23,522 cf.

As per the Ordinance a second calculation is required to determine which method results is the higher water quality volume. As shown below the land cover change from pre to post within the 48.93 acres of development area the water quality volume is calculated as 0.996 ac-ft or 43,419 cf.

2-year/24 hour rain event = 3.0 inches

EXISTING CONDITIONS

COVER TYPE/CONDITION	SOIL TYPE	AREA (sf)	Area (ac)	CN	S	Ia (0.2*S)	Q (runoff) (in)	Runoff Vol. (ft^3)	Runoff Vol. (ac-ft)
Woodlands	B	324,086	7.44	55	8.18	-	0.19	5,261	0.121
Grass (Good Condition)	B	106,722	2.45	61	6.39	-	0.37	3,247	0.075
Grass (Poor)	B	1,574,258	36.14	79	2.66	-	1.19	155,907	3.579
Impervious	B	126,324	2.90	98	0.20	-	2.77	29,140	0.669
TOTAL		**2,131,391**	**48.93**					**193,555**	**4.444**

DEVELOPED CONDITIONS

COVER TYPE/CONDITION	SOIL TYPE	AREA (sf)	Area (ac)	CN	S	Ia (0.2*S)	Q (runoff) (in)	Runoff Vol. (ft^3)	Runoff Vol. (ac-ft)
Grass (Good Condition)	B	106,722	0.47	61	6.39	-	0.37	623	0.014
Grass (Poor)	B	1,898,345	43.70	79	2.66	-	1.19	188,520	4.328
Impervious	B	126,324	4.76	98	0.20	-	2.77	47,830	1.098
TOTAL		**2,131,391**	**48.93**					**236,974**	**5.440**

INITIAL CHANGE IN RUNOFF VOLUME (POST-PRE)		
CONDITION	Runoff Volume (ft^3)	Runoff Volume (ac-ft)
EXISTING CONDITIONS	193,555	4.444
DEVELOPED CONDITIONS	236,974	5.440
INITIAL CHANGE IN RUNOFF VOLUME	**+43,419**	**+0.996**

Based upon the calculations above, the larger of the two volumes calculated utilized calculation #2 which resulted in a water quality volume of 43,419 cf.

The water quality volume is accounted for under post development conditions by utilizing the following BMP's in series.

1.) Vegetated Swales

2.) Extended Detention Basins

Refer to Appendix N for more details regarding the Water Quality Volume Analysis.

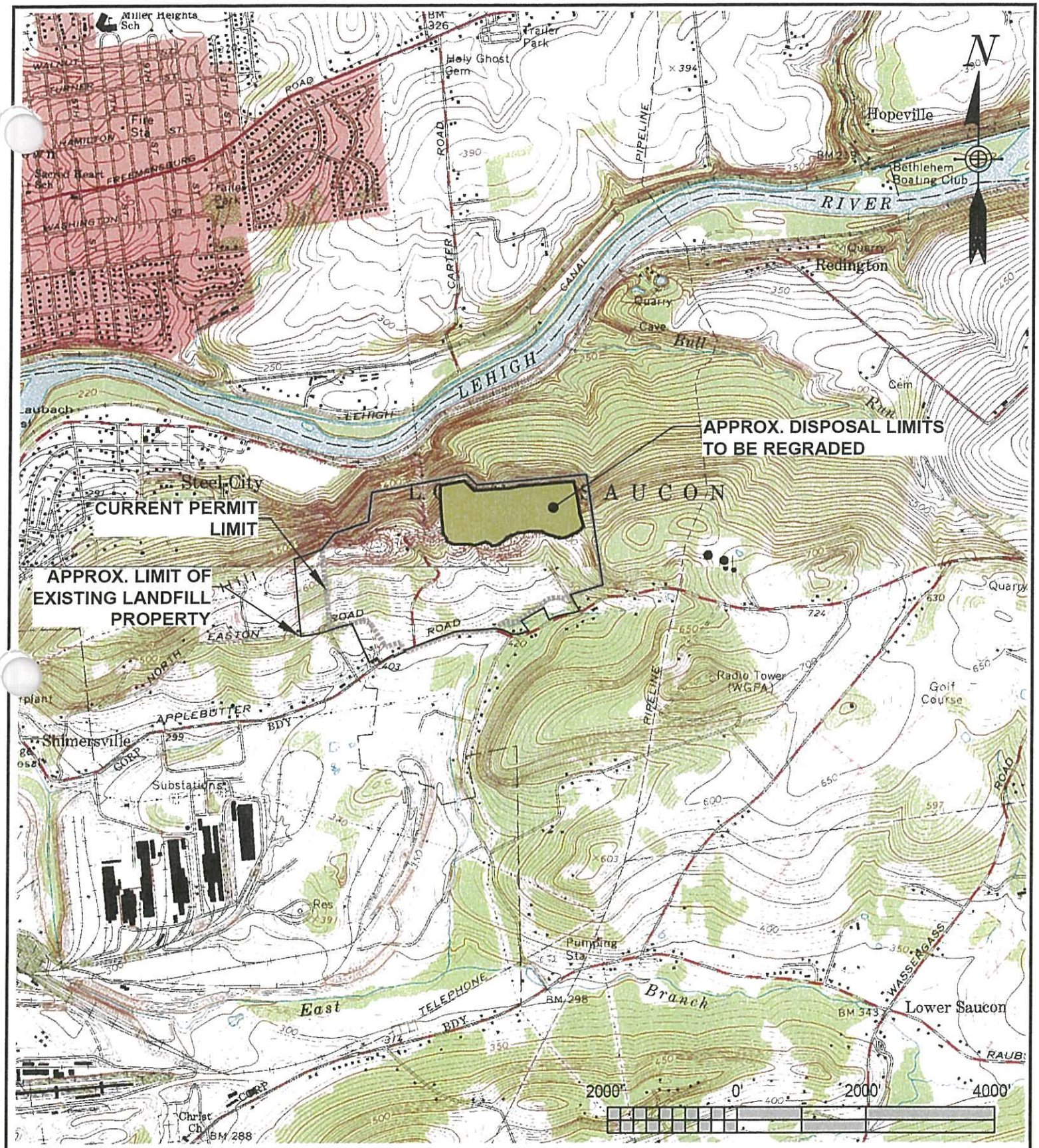
10. Conclusion

We certify that this Stormwater Management Report has been prepared according to accepted professional engineering means, methods and standards. The plan is designed in compliance with Lower Saucon Township Stormwater Management Ordinance. The calculations demonstrate that the objectives stated in Section 2 have been met.

SECTION 10

Appendix A

USGS 7.5-Minute Series Location Map
Federal Emergency Management Agency NFIP Map



MAP SOURCE: NAZARETH & HELLERTOWN USGS QUADS SCALE: 1" = 2000'

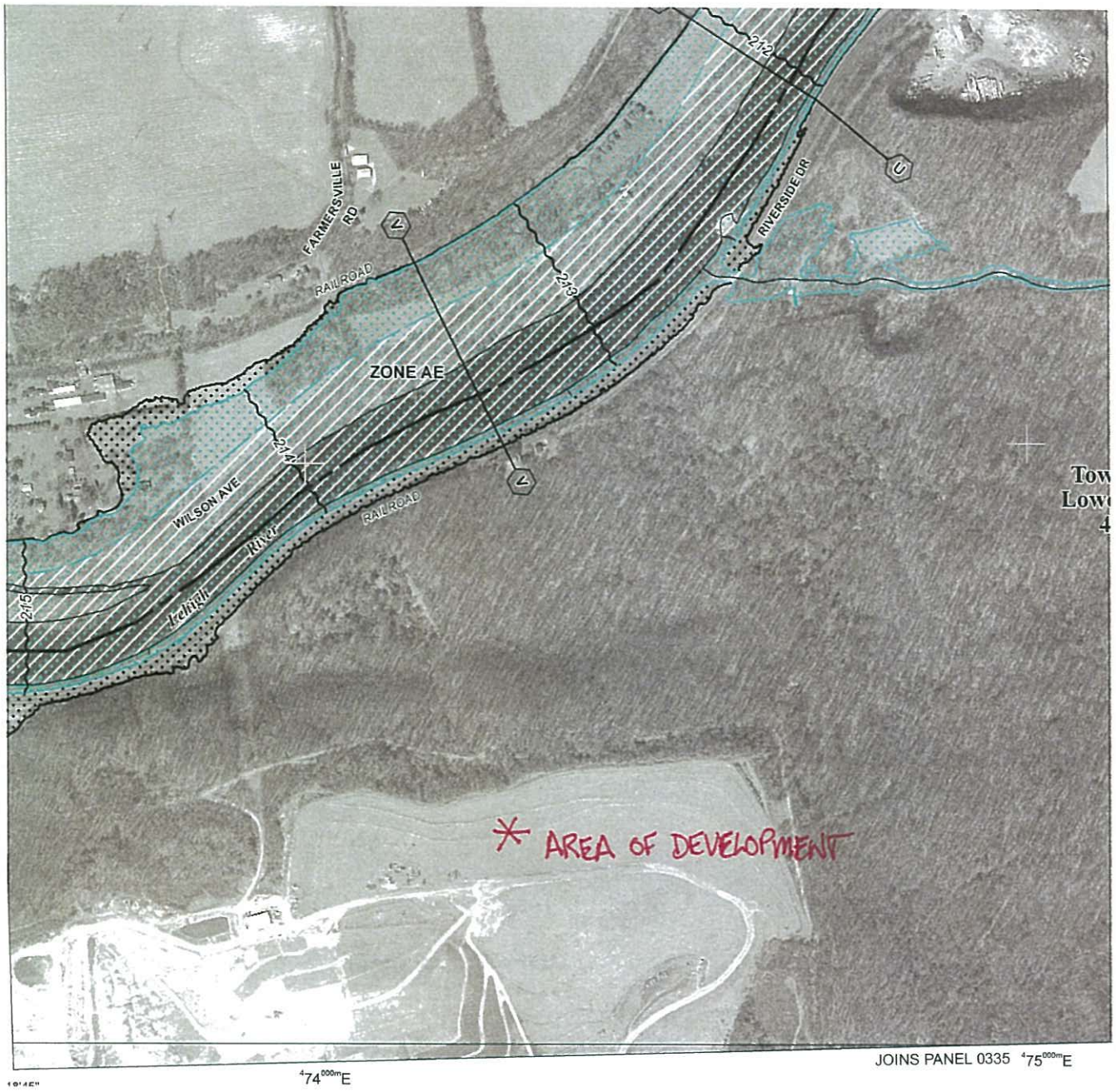
martin and martin incorporated
37 south main street • suite A
chambersburg, pennsylvania . 17201
phone: (717) 264-6759

1162_4LOCAL20-01.DWG

NORTHERN REALIGNMENT

LOWER SAUCON TWP. NORTHAMPTON CO.

Bethlehem Landfill Company
WASTE CONNECTIONS INC.
Connect with the Future
2335 Applebutter Road Bethlehem, Pennsylvania 18015



250 0 500 1000 FEET

150 0 150 300 METERS

NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0268E

FIRM

FLOOD INSURANCE RATE MAP

NORTHAMPTON COUNTY, PENNSYLVANIA

(ALL JURISDICTIONS)

PANEL 268 OF 355

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

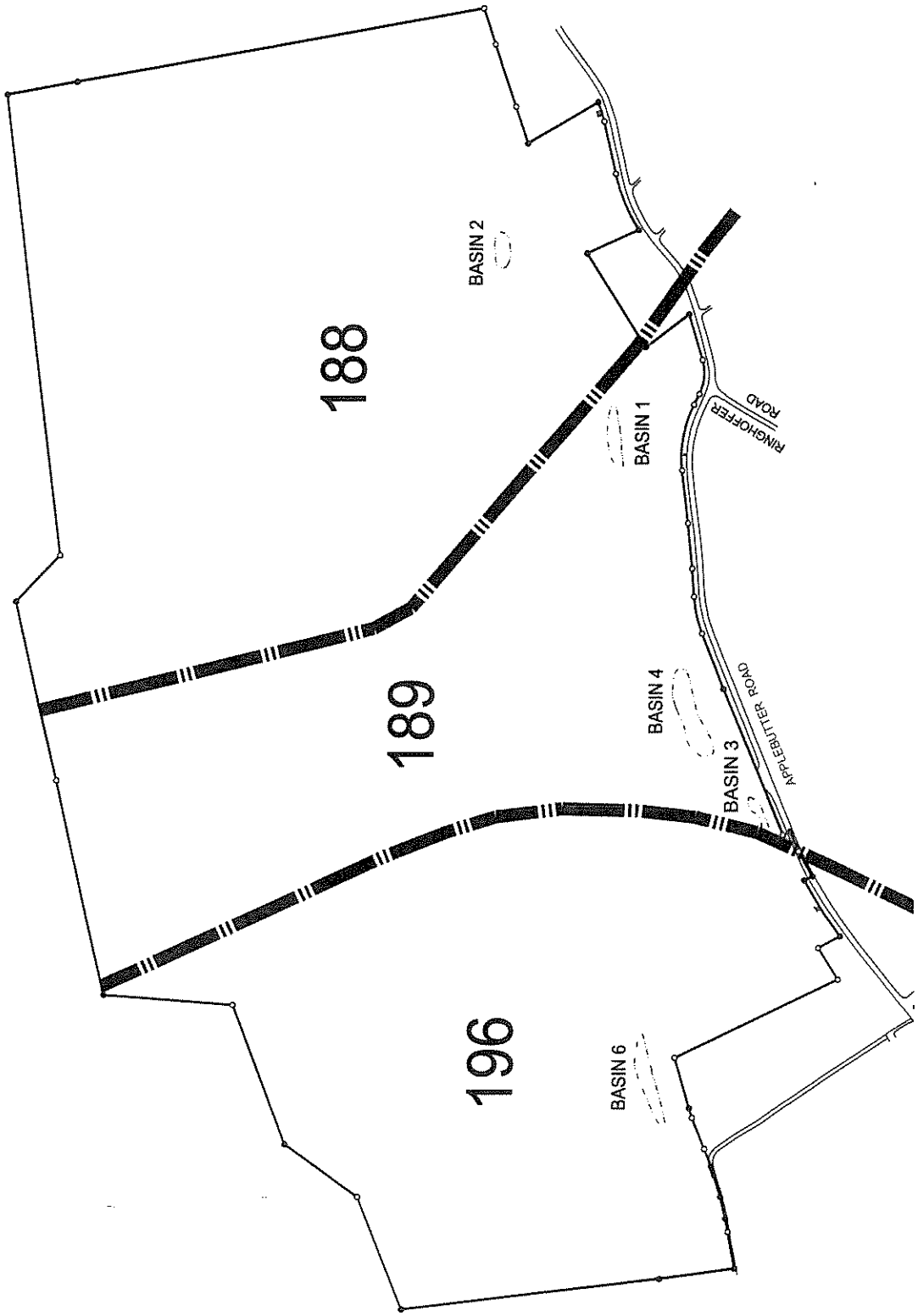
COMMUNITY	NUMBER	PANEL	SUFFIX
BETHLEHEM, TOWNSHIP OF	420980	0268	E
EASTON, CITY OF	425383	0268	E
LOWER SAUCON, TOWNSHIP OF	420982	0268	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
42095C0268E

MAP REVISED
JULY 16, 2014

Federal Emergency Management Agency



BMP's	SUB AREA	RELEASE RATES (%)
BASIN 2	188	30/50
BASINS 1,3 & 4	189	100
BASIN 6	196	100

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

LOWER SACON TOWNSHIP NORTHAMPTON COUNTY

Saucon Creek Watershed Release Rate Map

IESI Bethlehem Landfill Corp.

PENNSYLVANIA

Scale:	1"=600'
Job #	1162.3
Date:	11/06/15
By:	DB
Chk'd:	JM

SECTION 10

Appendix B

NRCS Soils Mapping and Reports

Soil Map—Northampton County, Pennsylvania
(IESI PA Bethlehem Landfill Soils Map)

Map Scale: 1:8,370 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0, 100, 200, 400, 600

Feet: 0, 400, 800, 1600, 2400

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Northampton County, Pennsylvania
Survey Area Data: Version 12, Sep 17, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 20, 2011—May 10, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

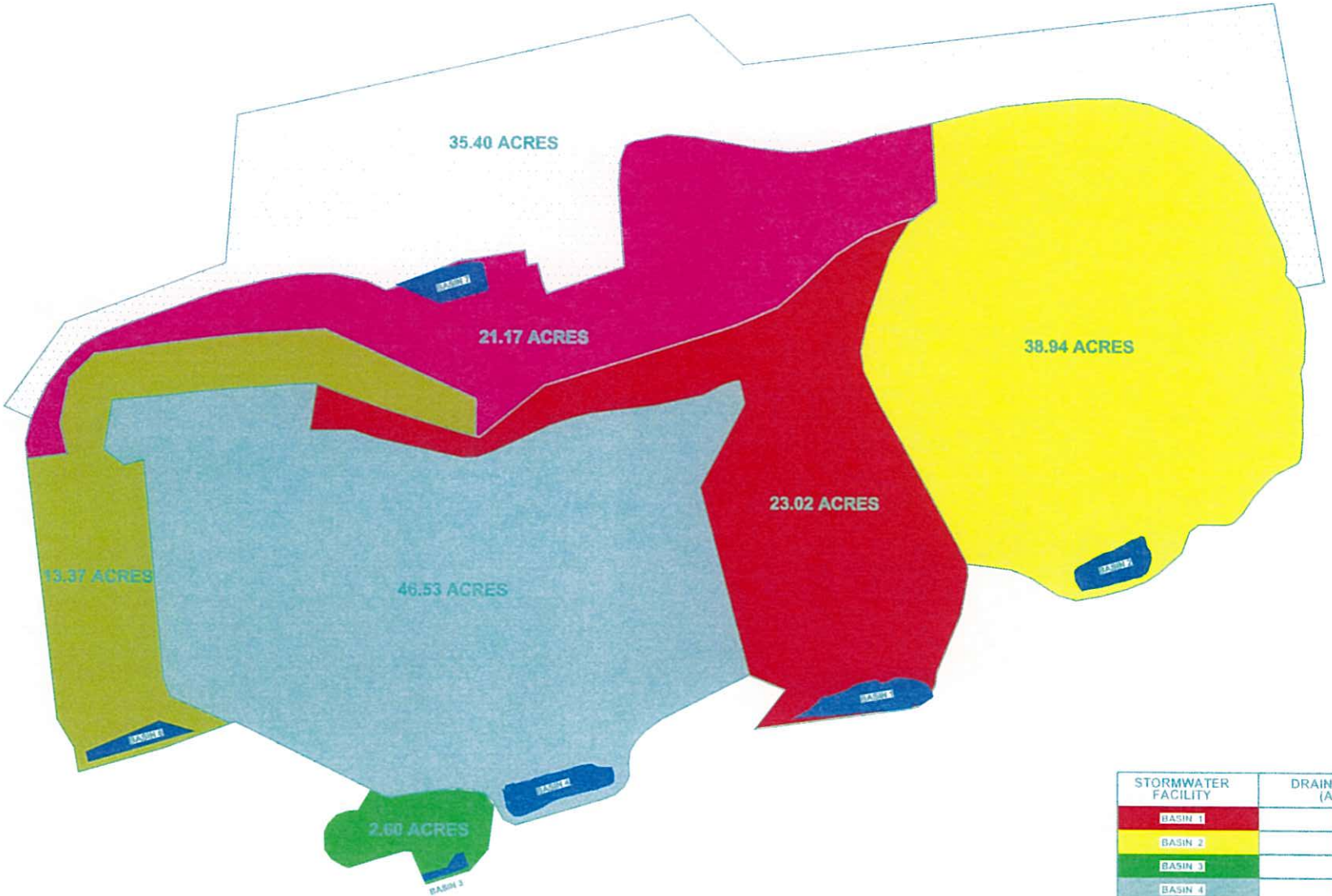
Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
CaB	Califon loam, 3 to 8 percent slopes	19.3	8.5%
GlB	Gladstone gravelly loam, 3 to 8 percent slopes	15.3	6.7%
GlC	Gladstone gravelly loam, 8 to 15 percent slopes	9.6	4.2%
GmF	Gladstone gravelly loam, 25 to 55 percent slopes, very bouldery	8.8	3.9%
GnD	Gladstone-Parker gravelly loams, 15 to 25 percent slopes	12.7	5.6%
UfB	Udorthents, sanitary landfill	156.0	68.6%
UupB	Urban land-Udorthents, schist and gneiss complex, 0 to 8 percent slopes	5.8	2.5%
Totals for Area of Interest		**227.4**	**100.0%**

SECTION 10

Appendix C

Historical Drainage Area Mapping

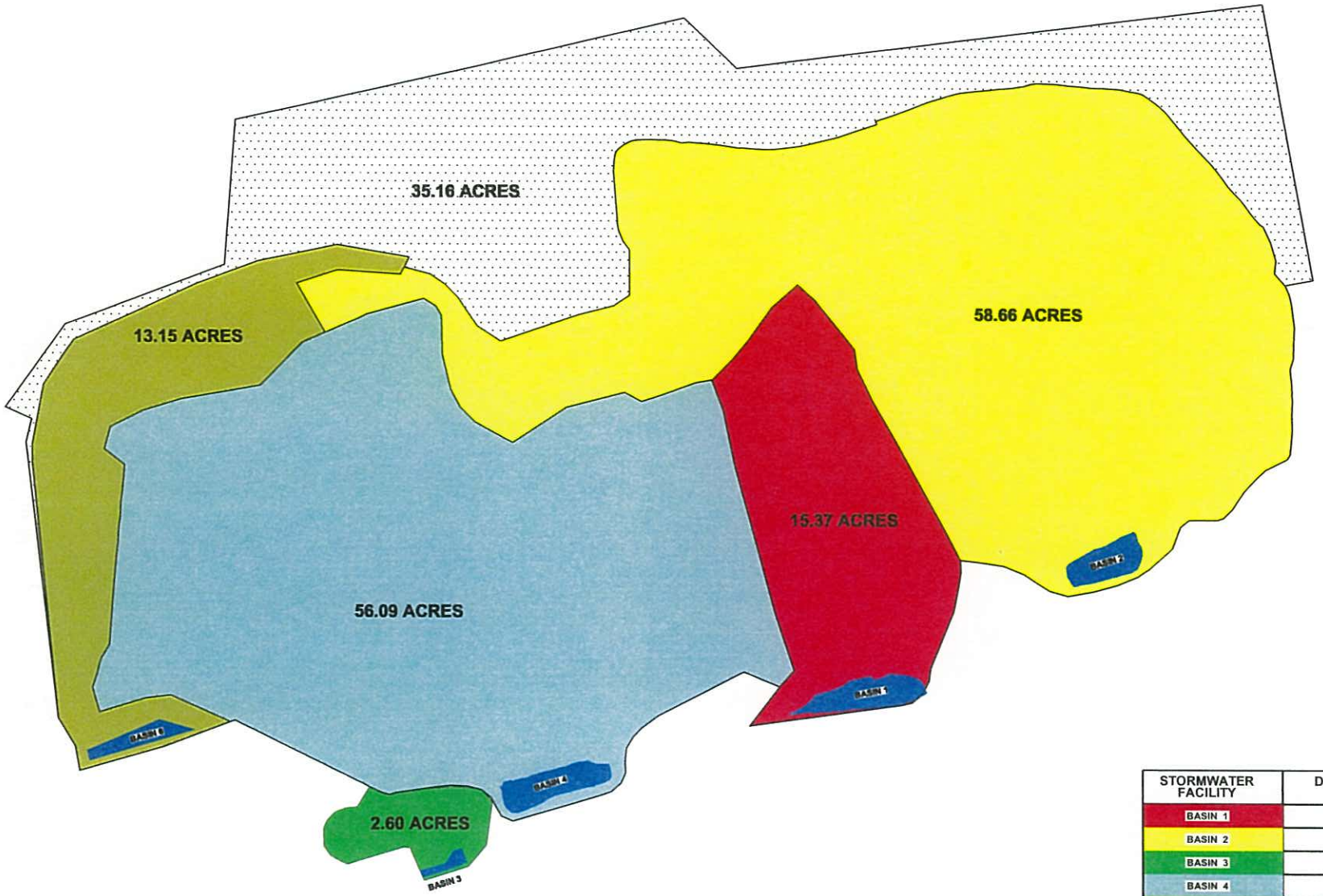


STORMWATER FACILITY	DRAINAGE AREA (ACRES)
BASIN 1	23.02
BASIN 2	38.94
BASIN 3	2.60
BASIN 4	46.53
BASIN 6	13.37
BASIN 7	21.17
LEHIGH RIVER	35.40
TOTAL	181.03

DRAINAGE AREA MAP

APPROVED PHASE IV 2003 PERMIT

EXHIBIT 1

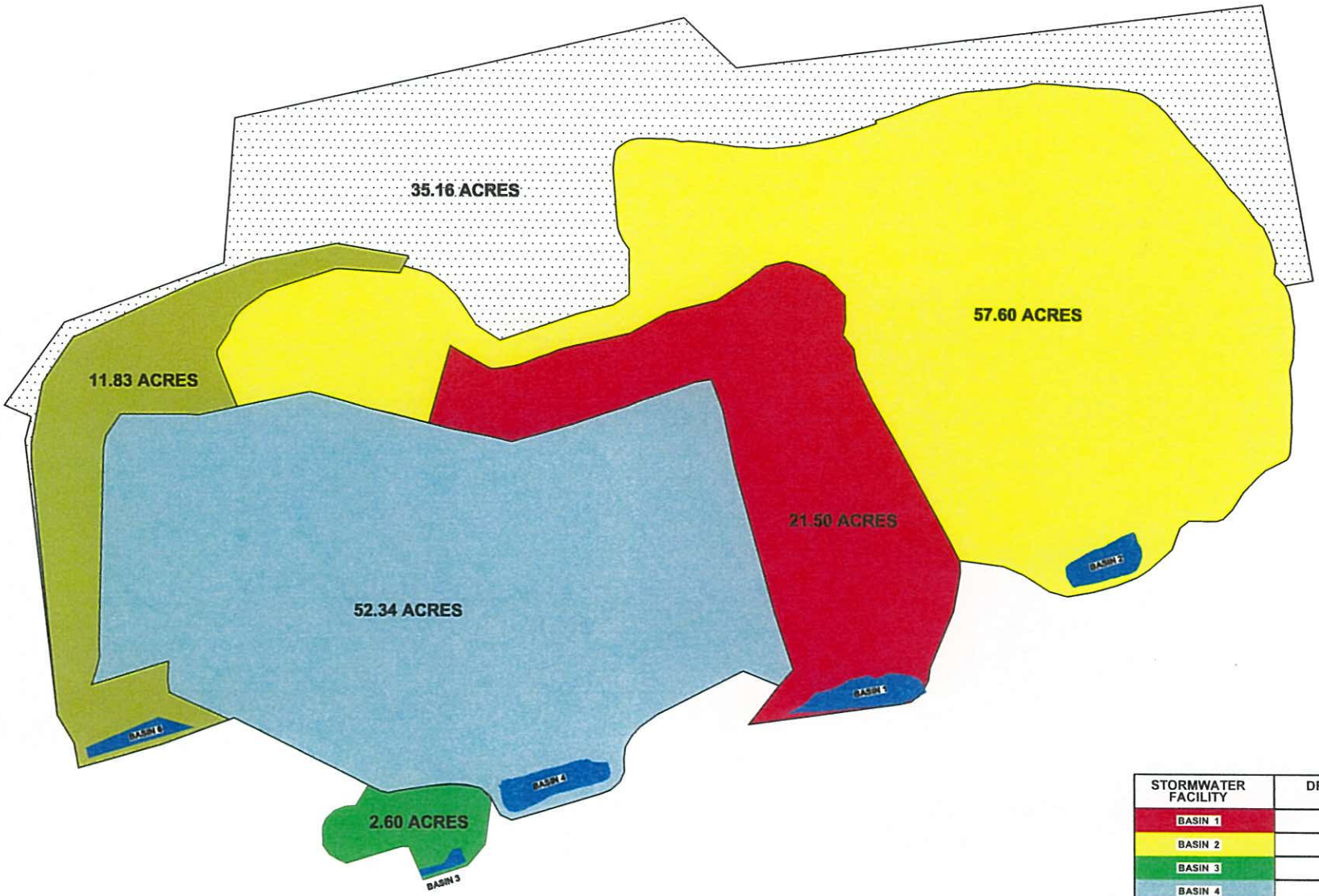


STORMWATER FACILITY	DRAINAGE AREA (ACRES)
BASIN 1	15.37
BASIN 2	58.66
BASIN 3	2.60
BASIN 4	56.09
BASIN 6	13.15
BASIN 7	0.00
LEHIGH RIVER (OFF SITE)	35.16
TOTAL	181.03

DRAINAGE AREA MAP

APPROVED CELL 4F - MINOR MODIFICATION

EXHIBIT 2

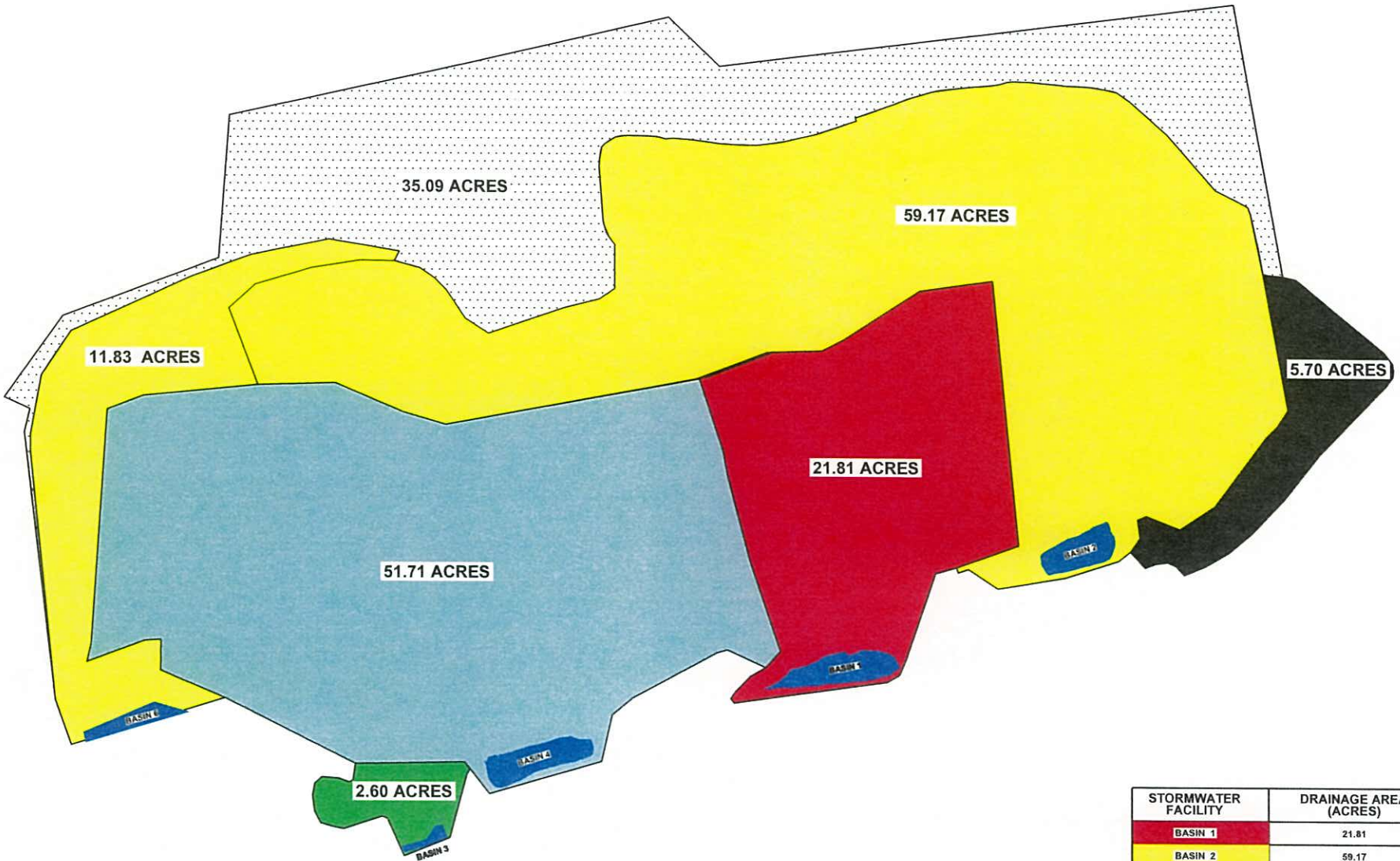


STORMWATER FACILITY	DRAINAGE AREA (ACRES)
BASIN 1	21.50
BASIN 2	57.58
BASIN 3	2.60
BASIN 4	52.34
BASIN 6	11.83
BASIN 7	0.00
LEHIGH RIVER (OFF SITE)	35.16
TOTAL	181.03

DRAINAGE AREA MAP

APPROVED FINAL GRADE ADJUSTMENT - CAP REMOVAL MINOR MODIFICATION

EXHIBIT 3

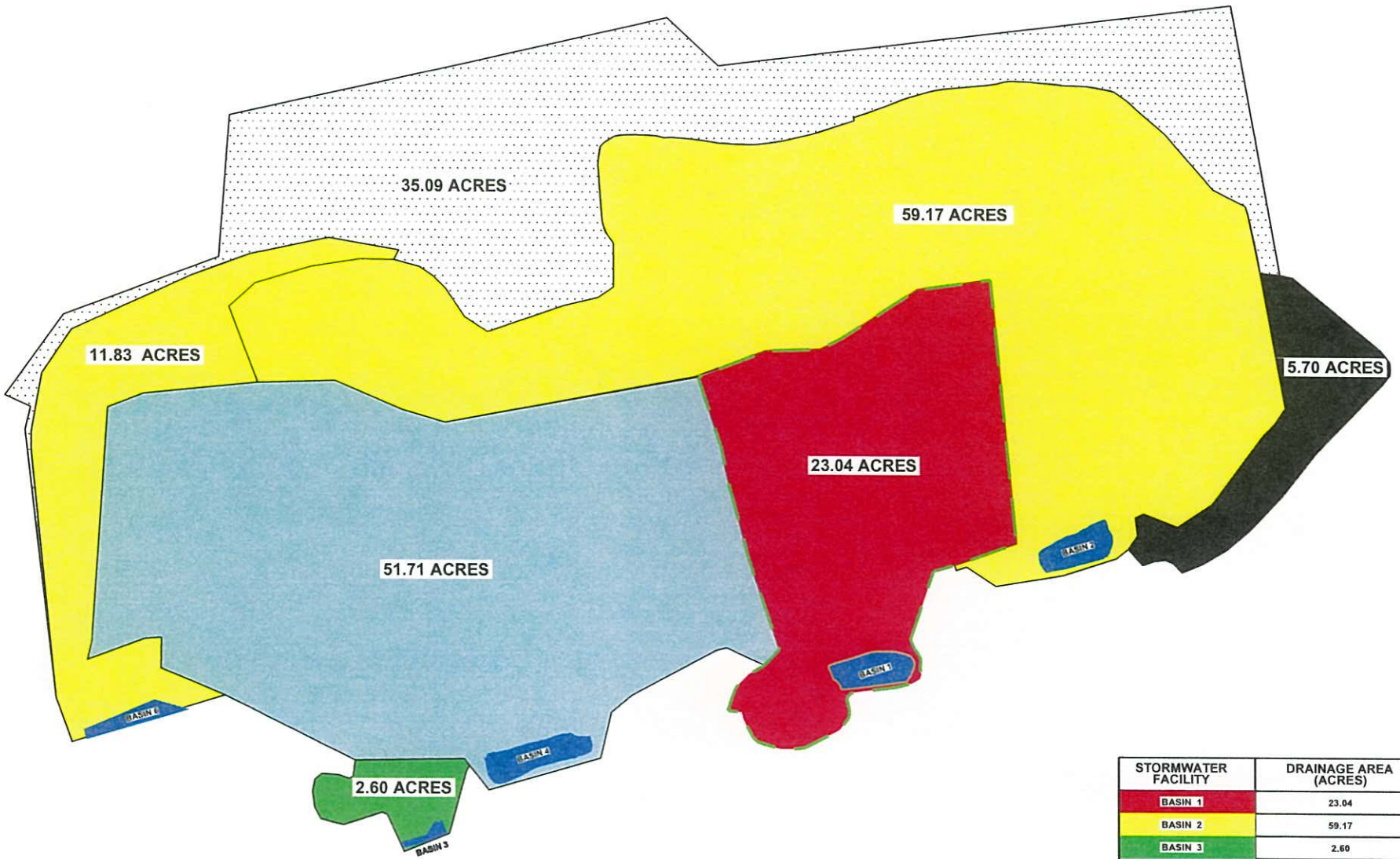


DRAINAGE AREA MAP

APPROVED SOUTHEASTERN REALIGNMENT - MAJOR MODIFICATION

STORMWATER FACILITY	DRAINAGE AREA (ACRES)
BASIN 1	21.81
BASIN 2	59.17
BASIN 3	2.60
BASIN 4	51.71
BASIN 6	11.83
AREA A	5.70
LEHIGH RIVER (OFF SITE)	35.09
TOTAL	187.91

EXHIBIT 4



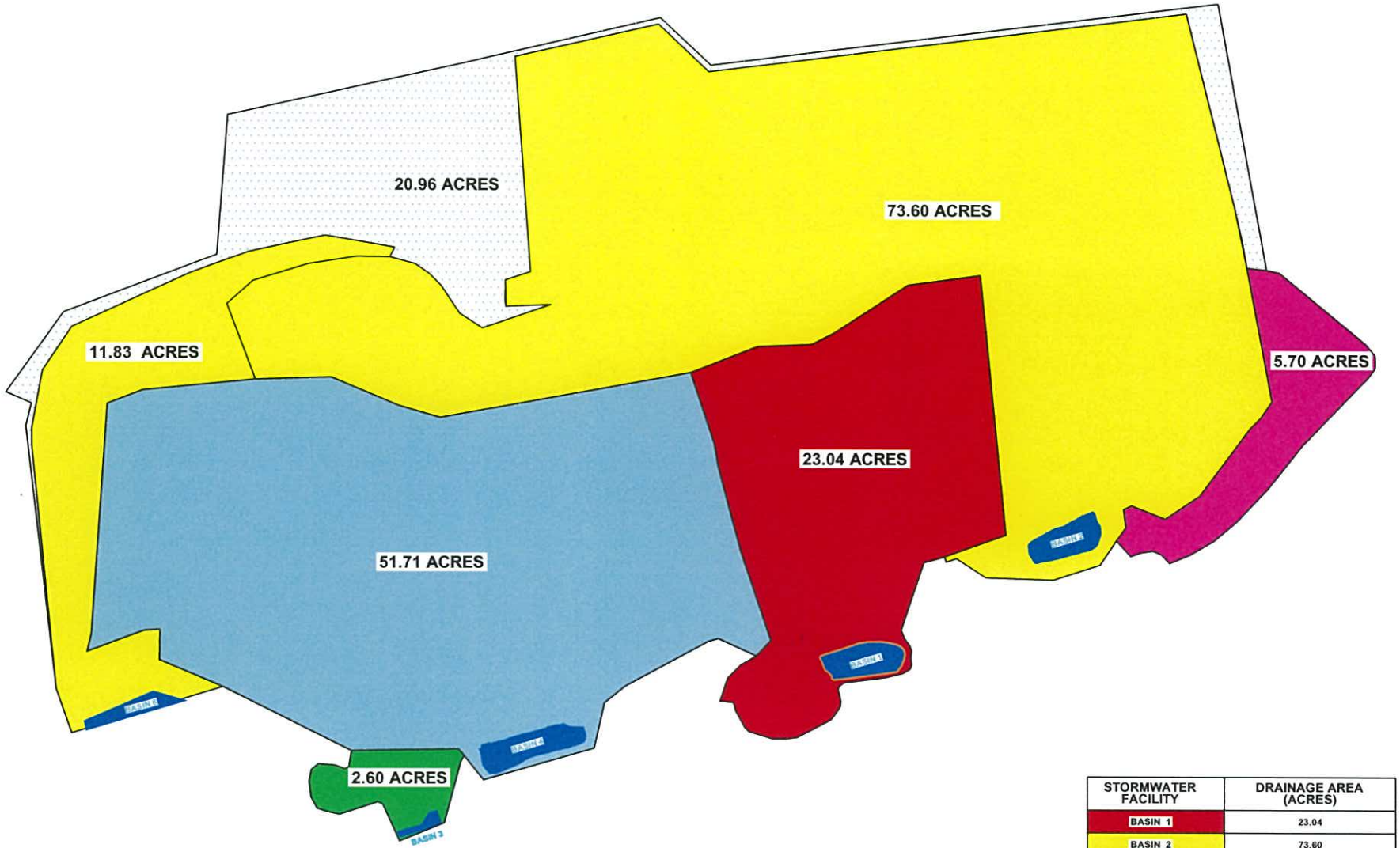
DRAINAGE AREA MAP

PROPOSED RNG FACILITY - MAJOR MODIFICATION

STORMWATER FACILITY	DRAINAGE AREA (ACRES)
BASIN 1	23.04
BASIN 2	59.17
BASIN 3	2.60
BASIN 4	51.71
BASIN 6	11.83
AREA A	5.70
LEHIGH RIVER (OFF SITE)	35.09
TOTAL	189.14

EXHIBIT 5

FILE LOCATION: FILESERVER\DWG\1162.5 (GAS PLAN)\EXHIBIT



DRAINAGE AREA MAP

PROPOSED NORTHERN REALIGNMENT - MAJOR MODIFICATION

STORMWATER FACILITY	DRAINAGE AREA (ACRES)
BASIN 1	23.04
BASIN 2	73.60
BASIN 3	2.60
BASIN 4	51.71
BASIN 6	11.83
AREA A	5.70
LEHIGH RIVER (OFF MYL)	20.96
TOTAL	189.44

EXHIBIT 6

FILE LOCATION: FILESERVER\DWG\1162.4 (NORTHERN EXPANSION)\EXHIBIT

SECTION 10

Appendix D

Drainage Area Mapping

SECTION 10

Appendix E

Time of Concentration Calculations

Appendix E

Time of Concentration Calculations

APPENDIX E

TIME OF CONCENTRATION FLOW PATH CALCULATION

Times of concentration calculation were computed within the SedCAD 4 Program. SedCAD 4 shows the time of concentration for each watershed. When combining or accumulating watersheds for structure design, a combined hydrograph of the tributary upslope sub-watersheds is used. Since the travel time between structures is rapid, the routing analysis between the structures considers the travel time to be zero (0) and the combined hydrograph of the tributary sub-watershed is utilized.

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#13	1	0.770	0.120	0.000	0.000	65.000	S	0.45	0.032
	Σ	**0.770**						**0.45**	**0.032**
#12	1	2.960	0.045	0.000	0.000	85.000	M	4.91	0.391
	Σ	**2.960**						**4.91**	**0.391**
#10	1	9.050	0.116	0.000	0.000	79.000	S	11.87	0.895
	Σ	**9.050**						**11.87**	**0.895**
#11	1	0.710	0.023	0.000	0.000	75.000	M	0.77	0.057
	Σ	**0.710**						**0.77**	**0.057**
#9	1	14.140	0.230	0.000	0.000	79.000	S	7.88	0.939
	Σ	**14.140**						**7.88**	**0.939**
#8	1	0.650	0.039	0.000	0.000	84.000	M	1.04	0.081
	Σ	**0.650**						**1.04**	**0.081**
#5	1	12.990	0.335	0.000	0.000	79.000	S	6.02	0.861
	Σ	**12.990**						**6.02**	**0.861**
#3	1	18.180	0.216	0.000	0.000	79.000	S	10.39	1.206
	Σ	**18.180**						**10.39**	**1.206**
#2	1	5.060	0.163	0.000	0.000	83.000	S	3.87	0.411
	Σ	**23.240**						**14.04**	**1.618**
#4	1	5.450	0.164	0.000	0.000	82.000	S	3.97	0.422
	Σ	**41.680**						**23.66**	**2.901**
#6	1	1.530	0.027	0.000	0.000	74.000	M	1.59	0.116
	Σ	**58.710**						**32.21**	**4.094**
#7	1	1.790	0.015	0.000	0.000	67.000	M	1.22	0.087
	Σ	**73.280**						**47.27**	**5.500**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#2	1	3. Short grass pasture "CHANNEL CC"	28.00	28.00	100.00	4.230	0.006
		8. Large gullies, diversions, and low flowing streams	0.50	6.00	1,200.00	2.120	0.157

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#2	**1**	**Time of Concentration:**					**0.163**
#3	1	3. Short grass pasture 'DS-8'	3.00	4.50	150.00	1.380	0.030
		3. Short grass pasture	3.00	19.85	661.66	1.380	0.133
		3. Short grass pasture	29.00	17.98	62.00	4.300	0.004
		6. Grassed waterway	2.56	10.49	410.00	2.390	0.047
		8. Large gullies, diversions, and low flowing streams	17.08	17.25	100.99	12.390	0.002
#3	**1**	**Time of Concentration:**					**0.216**
#4	1	3. Short grass pasture 'CHANNEL BB'	28.21	22.00	77.98	4.240	0.005
		6. Grassed waterway	3.00	28.34	944.66	2.590	0.101
		8. Large gullies, diversions, and low flowing streams	0.50	2.25	450.00	2.120	0.058
#4	**1**	**Time of Concentration:**					**0.164**
#5	1	3. Short grass pasture 'DS-9'	2.83	4.24	150.00	1.340	0.031
		3. Short grass pasture	3.02	22.77	753.97	1.390	0.150
		3. Short grass pasture	26.47	17.99	67.96	4.110	0.004
		6. Grassed waterway	2.99	41.97	1,403.67	2.590	0.150
		8. Large gullies, diversions, and low flowing streams	8.33	1.99	23.88	8.650	0.000
#5	**1**	**Time of Concentration:**					**0.335**
#6	1	6. Grassed waterway 'CHANNEL N'	40.00	80.00	200.00	9.480	0.005
		6. Grassed waterway	20.00	80.00	400.00	6.700	0.016
#6	**1**	**Time of Concentration:**					**0.027**
#7	1	3. Short grass pasture 'BASIN 2'	5.00	5.00	100.00	1.780	0.015
#7	**1**	**Time of Concentration:**					**0.015**
#8	1	8. Large gullies, diversions, and low flowing streams 'CHANNEL AA'	0.50	1.50	300.00	2.120	0.039
#8	**1**	**Time of Concentration:**					**0.039**
#9	1	3. Short grass pasture 'DS-7'	2.83	4.24	150.00	1.340	0.031
		3. Short grass pasture	3.90	11.50	294.87	1.570	0.052
		6. Grassed waterway	3.05	41.93	1,374.75	2.610	0.146
		8. Large gullies, diversions, and low flowing streams	26.83	22.00	81.99	15.530	0.001
#9	**1**	**Time of Concentration:**					**0.230**
#10	1	3. Short grass pasture 'DS-6'	33.00	24.75	75.00	4.590	0.004
		6. Grassed waterway	3.00	30.00	1,000.00	2.590	0.107
		8. Large gullies, diversions, and low flowing streams	33.00	115.50	350.00	17.230	0.005
#10	**1**	**Time of Concentration:**					**0.116**
#11	1	3. Short grass pasture 'CHANNEL Z'	33.00	23.10	70.00	4.590	0.004
		6. Grassed waterway	2.00	3.00	150.00	2.120	0.019
#11	**1**	**Time of Concentration:**					**0.023**
#12	1	3. Short grass pasture	33.00	16.49	49.96	4.590	0.003
		6. Grassed waterway	12.00	96.00	800.00	5.190	0.042

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#12	**1**	**Time of Concentration:**					**0.045**

#13 'I-19' 0.120

SECTION 10

Appendix F

Runoff Curve Numbers (CN)/Weighted CN Calculations

Appendix F

Runoff Curve Numbers (CN)/Weighted CN Calculations

APPENDIX F

RUNOFF CURVE NUMBER (CN) CALCULATION

Runoff curve numbers for the project drainage shed (Basin #2) was obtained from Appendix C-3 of the Lower Saucon Township Stormwater Ordinance. A copy is attached hereto. Under pre-development conditions three (3) distinct land covers exist within the area of analysis. These are woods, paved/impervious and open space.

Pre-development analysis for Basin 2 was taken from the Phases III and IV analysis and as such the previously utilized CN numbers have been maintained. These are 61 for grass areas outside the landfill footprint and 79 for grass areas within the landfill footprint.

Post development conditions yield the same three land covers as utilized in pre-development consisting of woods, paved/impervious and open space. However, as was done within the Phases III and IV analysis open space was broken into two categories, good and poor, relating to capped areas for final closure grades. Thus the curve numbers utilized within the analysis are as follows:

Woods	=	55
Grass – Open Space (Good)	=	61
Grass – Open Space (Poor)	=	79
Impervious	=	98

Since this analysis is for post closure it is assumed all open space areas (channels, fill slopes) shall be considered good condition. Thus, each sub-watershed weighted Cn is calculated as follows:

Drainage Area ID	CN	Weighted CN
DS-7	79	

Drainage Area ID	CN	Weighted CN
DS-8	79	
DS-9	79	
Channel AA	84	$\frac{(0.18)(98) + (0.47)(79)}{(0.65)} = 84$
Channel BB	82	$\frac{(0.87)(98) + (4.58)(79)}{(5.45)} = 82$
Channel CC	83	$\frac{(1.06)(98) + (4.0)(79)}{(5.06)} = 83$
Channel Z	75	$\frac{(0.16)(61)+(0.55)(79)}{(0.71)} = 75$
Channel N	74	$\frac{(0.3)(98) + (.76)(61)+(.47)(79)}{(1.53)} = 74$
Basin #2	67	$\frac{(0.28)(98) + (1.79)(61)}{(2.07)} = 66$
DS-6	79	
Channel M	85	$\frac{(1.18)(98) + (0.33)(61)+(1.45)(79)}{(2.96)} = 85$
I-19	65	$\frac{(.61)(61)+(0.16)(79)}{(0.77)} = 65$

Given the above, the post development composite CN for the tributary area to Basin #2 is calculated as follows:

$$\frac{(3.87 \text{ ac.})(98) + (3.65 \text{ ac.})(61) + (66.06 \text{ ac.})(79)}{73.60 \text{ ac.}} = 79 \text{ (Composite CN Basin \#2)}$$

Appendix C-3
Runoff Curve Numbers and Percent Imperviousness Values*

Cover Description		Curve numbers for hydrologic soil group**			
Land Use/Cover Type	**Average percent impervious area**	**A**	**B**	**C**	**D**
Open space (lawns, parks, golf courses, cemeteries, etc.):					
Good condition (grass cover greater than 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
c acre or less (townhouses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
a acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Woods		30	55	70	77
Agriculture	Refer to Table 2-2b in source document (TR55) by crop type and treatment.				

* Source: Natural Resources Conservation Service Technical Release No. 55, Second Edition, June 1986.

** Hydrologic soil group based on the county soil survey, latest edition.

REFER TO Table 2.2a OF TR-55 FOR OPEN SPACE "POOR" CONDITION CN = 79 FOR USE WITHIN LANDFILL FOOTPRINT

Table 2-2a Runoff curve numbers for urban areas [1]

Cover description: Cover type and hydrologic condition	Average percent impervious area [2]	Curve numbers for hydrologic soil group: A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.) [3]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) [4]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation) [5]		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

[1] Average runoff condition, and $I_a = 0.2S$.

[2] The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.

[3] CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

[4] Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

[5] Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

137 Attachment 17

Township of Lower Saucon

Appendix C-4
Runoff Coefficients for the Rational Method*

Land Use	Hydrologic Soil Group and Slope Range**											
	A			B			C			D		
	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+
Cultivated[A]	0.18[1]	0.23	0.28	0.24	0.29	0.33	0.30	0.34	0.38	0.33	0.37	0.41
	0.23[2]	0.29	0.34	0.30	0.36	0.40	0.36	0.41	0.45	0.39	0.44	0.48
Pasture[B]	0.09	0.13	0.17	0.19	0.24	0.29	0.27	0.31	0.36	0.31	0.35	0.39
	0.12	0.17	0.23	0.24	0.30	0.36	0.33	0.38	0.43	0.37	0.42	0.46
Meadow, lawn[C]	0.05	0.08	0.12	0.15	0.20	0.24	0.23	0.28	0.32	0.28	0.32	0.36
	0.07	0.12	0.17	0.19	0.25	0.30	0.28	0.34	0.39	0.33	0.39	0.43
Forest, woods	0.03	0.05	0.08	0.11	0.16	0.20	0.20	0.25	0.29	0.25	0.30	0.34
	0.04	0.08	0.12	0.15	0.21	0.26	0.25	0.31	0.36	0.31	0.37	0.41
Gravel	0.24	0.29	0.33	0.32	0.36	0.40	0.35	0.39	0.43	0.37	0.41	0.44
	0.30	0.36	0.40	0.38	0.43	0.47	0.42	0.46	0.50	0.44	0.48	0.51
Parking, other impervious	0.85	0.86	0.87	0.85	0.86	0.87	0.85	0.86	0.87	0.85	0.86	0.87
	0.95	0.96	0.97	0.95	0.96	0.97	0.95	0.96	0.97	0.95	0.96	0.97
Residential, commercial, industrial and other "developed"	Runoff coefficients should be calculated based upon weighted average of impervious area coefficients and pervious area coefficients from above based upon soil type, slope and the particular development proposal.											

WQ_v CALC. UTILIZES: 0.30 FOR OPEN SPACE "GOOD"
0.43 FOR OPEN SPACE "POOR"

SECTION 10

Appendix G

Pre-Construction Watershed Calculations

Appendix G

Pre-Construction Watershed Calculations

IESI PA Bethlehem Landfill

Phase III

Basin #1 Analysis

From

Gannett Fleming 1993 Report

JMM

Martin & Martin Inc.
37 South Main Street
Suite A
Chambersburg, PA

Phone: 717-264-6759

CITY OF BETHLEHEM - SANITARY LANDFILL - 3-5-93
PHASE 3 (CELLS 3-A, 3-B, 3-C, AND 3-D)
CLOSURE GRADES : 25-YR, 24-HR STORM EVENT

COMBINED HYDROGRAPH

INCLUDES SUBAREAS: 17, 18, 19, 20, 21, 22, 23, 24, 25

TOTAL AREA = 0.0270 SQ.MI.

STORM VOLUME = 5.72 INCHES

RUNOFF VOLUME = 3.27 INCHES

= 4.71 ACRE-FEET

PEAK DISCHARGE = 85.18 CFS

TIME (HOURS)	FLOW (CFS)	TIME (HOURS)	FLOW (CFS)
11.00	2.11	12.70	6.64
11.50	4.48	12.80	6.25
11.70	19.93	12.90	6.05
11.80	85.18	13.00	5.77
11.90	65.31	13.20	4.63
12.00	42.68	13.50	4.25
12.10	21.71	14.00	3.45
12.20	14.31	14.50	2.92
12.30	12.17	15.00	2.57
12.40	10.96	16.00	2.12
12.50	9.95	18.00	1.59
12.60	7.65	20.00	1.24

```
NTIT= 6
 TITLE( 1 )=THE CITY OF BETHLEHEM  -  SANITARY LANDFILL    3-30-93          FILE NAME: MODBAS1.25Y
 TITLE( 2 )=ROUTING OF THE 25-YEAR, 24-HOUR SCS TYPE II STORM THROUGH EXISTING SEDIMENT BASIN NO. 1 (FINAL CLOSURE GRADES)
 TITLE( 3 )=EXISTING 36" CMP RISER WITH 4 ROWS OF HOLES (18 HOLES IN A ROW) SPACED 12" VERT. STARTING AT EL. 441.5
 TITLE( 4 )=TOP OF RISER @ EL. 447.34, SPILLWAY @ EL. 447.85, TOP OF EMBANKMENT @ EL. 450.3
 TITLE( 5 )=EXISTING OUTLET IS A 24" CMP - 110' @ 13.0%,  BASIN INVERT @ EL. 435.00
 TITLE( 6 )=ASSUME THAT THE BASIN IS FULL UP TO THE FIRST ROW OF PERFORATIONS (EL. 441.50)
NSD= 13      NSS= 6      NQIN= 24
   STAGE-DISCHARGE CURVE
       441.50              0.00
       442.50              0.47
       443.50              0.79
       444.50              1.11
       447.34              1.83
       447.85             12.57
       447.90             14.48
       448.00             19.17
       448.10             24.63
       448.20             30.78
       448.30             37.48
       448.50             52.43
       449.00             78.65
  STAGE-STORAGE CURVE
       441.50              0.00
       442.00          19265.00
       444.00          77914.00
       446.00         149386.00
       448.00         236037.00
       450.00         338320.00
  INFLOW HYDROGRAPH
       11.00              2.11
       11.50              4.48
       11.70             19.93
       11.80             85.18
       11.90             65.31
       12.00             42.68
       12.10             21.71
       12.20             14.31
       12.30             12.17
       12.40             10.96
       12.50              9.95
       12.60              7.65
       12.70              6.64
       12.80              6.25
       12.90              6.05
       13.00              5.77
       13.20              4.63
       13.50              4.25
       14.00              3.45
       14.50              2.92
       15.00              2.57
       16.00              2.12
       18.00              1.59
       20.00              1.24
```

THE CITY OF BETHLEHEM - SANITARY LANDFILL 3-30-93 FILE NAME: MODBAS1.25Y

ROUTING OF THE 25-YEAR, 24-HOUR SCS TYPE II STORM THROUGH EXISTING SEDIMENT BASIN NO. 1 (FINAL CLOSURE GRADES)

EXISTING 36" CMP RISER WITH 4 ROWS OF HOLES (18 HOLES IN A ROW) SPACED 12" VERT. STARTING AT EL. 441.5

TOP OF RISER @ EL. 447.34, SPILLWAY @ EL. 447.85, TOP OF EMBANKMENT @ EL. 450.3

EXISTING OUTLET IS A 24" CMP - 110' @ 13.0%, BASIN INVERT @ EL. 435.00

ASSUME THAT THE BASIN IS FULL UP TO THE FIRST ROW OF PERFORATIONS (EL. 441.50)

TIME (HOURS)	INFLOW (CFS)	AVERAGE INFLOW (CFS)	INFLOW VOLUME (CF)	STORAGE CARRYOVER (CF)	TOTAL IN (CF)	TRIAL W.S. ELEVATION (FT)	OUTFLOW RATE (CFS)	AVERAGE OUTFLOW (CFS)	VOLUME OUT (CF)	BAL. IN STORAGE (CF)	CORRES. W.S. ELEVATION (FT)
11.00	2.11					441.50	0.00				
		3.29						0.04			
11.50	4.48		5931	0	5931	441.65	0.07		64	5867	441.65
		12.21						0.12			
11.70	19.93		8788	5867	14654	441.88	0.18		90	14564	441.88
		52.55						0.32			
11.80	85.18		18920	14564	33484	442.48	0.46		115	33369	442.48
		75.25						0.61			
11.90	65.31		27088	33369	60457	443.40	0.76		219	60238	443.40
		54.00						0.86			
12.00	42.68		19438	60238	79676	444.04	0.96		310	79367	444.04
		32.20						1.01			
12.10	21.71		11590	79367	90957	444.35	1.06		365	90592	444.35
		18.01						1.09			
12.20	14.31		6484	90592	97076	444.53	1.12		392	96683	444.53
		13.24						1.13			
12.30	12.17		4766	96683	101450	444.65	1.15		407	101042	444.65
		11.56						1.16			
12.40	10.96		4163	101042	105206	444.75	1.17		418	104788	444.75
		10.46						1.19			
12.50	9.95		3764	104788	108552	444.85	1.20		427	108125	444.85
		8.80						1.21			
12.60	7.65		3168	108125	111293	444.92	1.22		435	110858	444.92
		7.15						1.22			
12.70	6.64		2572	110858	113430	444.98	1.23		441	112990	444.98
		6.45						1.24			
12.80	6.25		2320	112990	115310	445.03	1.25		446	114864	445.03
		6.15						1.25			
12.90	6.05		2214	114864	117078	445.08	1.26		451	116627	445.08
		5.91						1.26			
13.00	5.77		2128	116627	118755	445.13	1.27		455	118300	445.13
		5.20						1.28			
13.20	4.63		3744	118300	122044	445.21	1.29		921	121123	445.21
		4.44						1.30			
13.50	4.25		4795	121123	125918	445.30	1.31		1406	124512	445.30
		3.85						1.33			
14.00	3.45		6930	124512	131442	445.43	1.35		2394	129048	445.43
		3.19						1.36			
14.50	2.92		5733	129048	134781	445.52	1.37		2444	132337	445.52
		2.75						1.38			
15.00	2.57		4941	132337	137278	445.59	1.39		2481	134798	445.59
		2.34						1.40			
16.00	2.12		8442	134798	143240	445.69	1.41		5036	138204	445.69
		1.85						1.42			
18.00	1.59		13356	138204	151560	445.77	1.43		10238	141321	445.77
		1.41						1.43			
20.00	1.24		10188	141321	151509	445.77	1.43		10315	141194	445.77
TOTALS			181463						40269		
PEAKS	85.18					445.77	1.43			141321	

IESI PA Bethlehem Landfill
Sedimentation Basin 2

Pre-Development

TAKEN FROM PHASE IV ANALYSIS

JMM

Martin & Martin, Inc.
37 S.Main St. Suite A
Chambersburg, PA 17201

Phone: 717-264-6759
Email: martinmartin@innernet.net

MODIFIED PULS BASIN ROUTING FOR BASIN &... BASIN #2 - PHASE III

INFLOW HYDROGRAPH FILENAME: B:B22YR.HYD
BASIN STORAGE-ELEVATION DATA FILENAME: B:BASIN2.ES
OUTLET STRUCTURE DISCHARGE/ELEVATION DATA FILENAME: B:BASIN2.EO

TIME hrs.	HYDROGRAPH INFLOW,cfs	BASIN INFLOW,cfs	STORAGE acre-ft	ELEVATION ft.ABOVE msl	BASIN OUTFLOW,cfs	OUTFLOW TOTAL,cfs	RE..N TIME
1100.00	1.30	1.30	0.000	460.00	0.00	0.00	
1100.10	1.4	1.40	0.011	460.16	0.00	0.00	
1100.20	1.60	1.60	0.024	460.34	0.00	0.00	
1100.30	1.80	1.80	0.039	460.54	0.00		
1100.40	10	1.10	0.054	460.77	0.00		
1100.50	2.40	2.40	0.072	461.03	0.00		
1100.60	2.70	2.70	0.093	461.33	0.00		
1100.70	7.90	7.90	0.137	461.96	0.00		
1100.80	13.10	13.10	0.224	462.20	0.00		
1100.90	18.30	18.30	0.354	462.52	0.00		
1101.00	40.00	40.00	0.595	463.10	0.00		
1101.1	66.60	66.60	1.035	464.08	0.00		
1101.2	48.60	48.60	1.511	464.70	0.00		
1101.30	32.50	32.50	1.805	465.08	0.00		
1101.40	14.30	14.30	1.956	465.27	0.00		
1101.50	10.80	10.80	2.058	465.40	0.00		
1101.60	8.90	8.90	2.139	465.51	0.00		
1101.70	7.30	7.30	2.206	465.59	0.00		
1101.80	6.40	6.40	2.262	465.67	0.10		
1101.90	5.90	5.90	2.311	465.73	0.16		
1102.00	5.50	5.50	2.352	465.79	0.19		
1102.10	5.10	5.10	2.389	465.84	0.21		
1102.20	4.80	4.80	2.420	465.89	0.22		
1102.30	4.50	4.50	2.475	465.94	0.25		
1102.40	4.30	4.30	2.509	465.99	0.27		
1102.50	4.10	4.10	2.541	466.02	0.29		
1102.60	3.90	3.90	2.572	466.05	0.31		

TOTAL ROUTING MASS BALANCE DISCREPANCY = .79

PEAK INFLOW = 66.60 cfs. PEAK OUTFLOW = 0.0 cfs.

ROUTING TIME STEP = 0.10 hours NUMBER OF OUTFLOW HYDROGRAPH POINTS = 2

USER MODULE <J-B> - SCS TR-55 TABULAR METHOD

WATERSHED TITLE: BASIN #1

1 YR. STORM PRECIPITATION = 3.2 in.

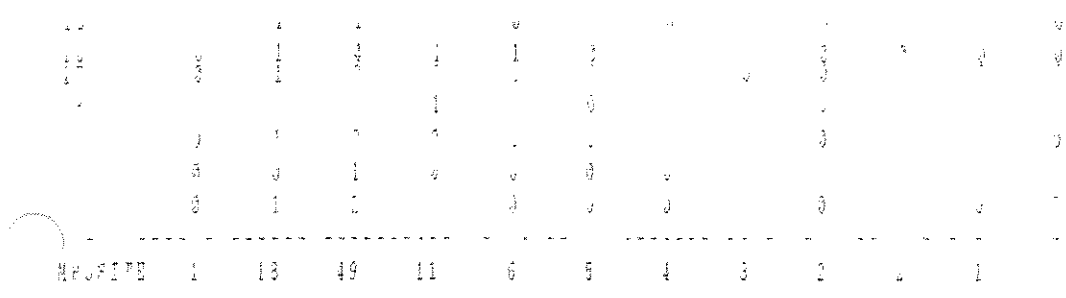
SUMMARY OF INPUT PARAMETERS

"LA"S'	AREA (sq mi	CURVE NUMBER	IA/P	RUNOFF (in'	TC 'hrs	ADJ. TC (hrs)	TT hrs	ADJ. TT (hrs)
	.12	90	0.156	1.40	0.190	0.200	0.000	0.000
1	0. 5	80	0.156	1.40	0.100	0.100	0.000	0.000
	0 002	80	0.156	1.40	0.100	0.200	0.000	0.000
	0 302	80	0.156	1.40	0.070	0.100	0 000	0.000
	0 001	80	0.156	1.40	0.050	0.100	0.000	0.000
	0 1	80	0.156	1 40	0.370	0 100	0.000	0.000
		80	0.156	1 40	0.040	0 100	0.000	0 000
	0.	80	0.156	1 40	0 070	0.100	0.000	0.000
	.0	80	0.156	1.40	0.030	0.100	0.000	0 000
	.1	80	0.156	1.40	0.090	0.100	0.000	0.000
	0	80	0 156	1.40	0 090	0.100	0.000	0.000
	0	80	0.156	1.40	0.040	0.100	0.000	0.000
	0 001	80	0.156	1.40	0.060	0 100	0.000	0.000
	0 001	80	0.156	1.40	0.080	0.100	0.000	0.000
		80	0.156	1.40	0 100	0 100	.000	0 000
	0. 4	80	0 156	1 40	0 120	0 100	1.000	1 000
	. 0	80	0.156	1.40	0. 90	0.100	0.000	0.000
	0 000	80	0 156	1 40	0 120	0.100	000	0.000
	0 000	80	0.156	1.40	0.090	0.100	0.000	0.000
	0. 41	80	0.156	1 40	0.080	0.100	0.000	0.000
	0 002	80	0.156	1.40	0.110	0.100	0.000	0 010
"OTAL	0. 5	80		1.40				

INDIVIDUAL SUBAREA & COMPOSITE HYDROGRAPHS

TIME (hrs,

	12.9	12.2	12 5	12.8	13.0	13 6	14.0	15.0	17.0	20.0	0
	2		13	3	0	0	1	1	1	0	0	0
	0	0	4	1	0	0	0	0	0	0	0	0
		0	2	0	0	0	0	0	0	0	0	0
		1	0		0	0	0	0	0	0	0	0
	0	0	1	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	0		0	
					0	0		0	0	0		
	0			0			0		0			
								0				
	0			0								



THE PEAK FLOW IS 5.6 cfs - OCCURS AT 12.1 hrs

MODULE <3-B> - SCS TR-55 TABULAR METHOD

WATERSHED TITLE: BASIN #2

10 YR. STORM: PRECIPITATION = 4.83 in

SUMMARY OF INPUT PARAMETERS

SUBAREA	AREA sq mi	CURVE NUMBER	IA/P	RUNOFF (in)	TC (hrs)	ADJ. TC (hrs)	TT hrs)	ADJ. TT (hrs)
1	0.1[illegible]	85	0.104	2.75	0.190	0.200	0.000	0.000
[illegible]	0.0[illegible]5	80	0.104	[illegible].75	0.100	0.100	0.000	0.000
[illegible]	0.00[illegible]	80	0.104	2.75	0.1[illegible]0	0.200	0.000	0.000
4	0.00[illegible]2	80	0.104	2.75	0.070	0.100	0.000	0.000
5	0.001	80	0.104	2.75	0.050	0.100	0.000	0.000
[illegible]	0.001	80	0.104	2.75	0.070	0.100	0.000	0.000
[illegible]	[illegible].001	80	0.104	2.75	0.040	0.100	0.000	0.000
[illegible]	0[illegible]	80	0.104	2.75	0.070	0.100	0.000	0.000
[illegible]	[illegible].00[illegible]	80	0.104	2.75	0.030	0.100	0.000	0.000
[illegible]	[illegible]	80	0.104	2.75	0.090	0.100	0.000	0.000
[illegible]	[illegible]	80	0.104	2.75	0.050	0.100	0.000	0.000
[illegible]	[illegible]	80	0.104	[illegible]. 5	0 040	0.10[illegible]	0.[illegible]0	0 000
1	[illegible].00[illegible]	80	0 104	2.75	0.060	0.100	0.000	0.000
4	[illegible]03	80	0.104	2.75	0.080	0.100	0.000	0.000
16	0.00[illegible]	80	0.104	2.75	0.10[illegible]	0.100	0.000	0.000
20	0004	90	0.104	2.75	0.120	0 100	0.000	0.020
[illegible]	[illegible] 0 [illegible]	80	0.104	2.75	0.080	0.100	0.000	0 000
5	[illegible].00[illegible]5	90	0.104	2.75	0.120	0.100	0.000	0.020
19	[illegible].00[illegible]	80	0 104	[illegible] 75	0.090	0.100	0.000	0.000
[illegible]	[illegible].011	80	0.104	2.75	0.080	0.100	0.000	0.000
1	0 [illegible]	80	0.104	2.75	0.110	0.100	0.000	0.010
MP[illegible]SITE	053	90		2.75				

INDIVIDUAL SUBAREA & COMPOSITE HYDROGRAPHS

[illegible]	TIME (hrs)											
	[illegible].1 0	11.9	12 [illegible]	[illegible]2.5	12.8	13 2	13.6	14.0	15.0	17.0	20.0	25.3
2	1	7	26	5	3	2	[illegible]	1	1	1	0	0
[illegible]	0	5	9	2	1	1	1	1	0	0	0	0
[illegible]	0	[illegible]	4	1	0	0	0	0	0	0	0	0
4	0	[illegible]	2	1	0	0	0	0	0	0	0	0
	0	1	2	0	0	0	0	0	0	0	0	0
	0		2	0	0	0	0	0	0	0	0	0
	0	1	2	0	0	0	0	0	0	0	0	0
3	0	0	0	1	1	1	0	0	0	0	0	0
9	0	0	1	0	0	0	0	0	0	0	0	
18	0	1	[illegible]	0		0	0	0	0	0	0	0
[illegible]	0		4	1	1				0	0	0	0
[illegible]	0		[illegible]	0				0	0	0	0	

1		2	3	2	1	1	1		0		0	0
1.	0	2	4	1								0
1	0	2	6	1	1	1	0	0	0	0	0	0
.9	0	0	4	1	1	0	0	0		0	0	
0	0	1	1	0	0			0	0	0	0	0
	0	2	4	1	1		0	0		0	0	0
TOTS	0	13	99	20	12	9	7	6	4	3	1	0

THE PEAK FLOW IS 134.9 cfs - OCCURS AT 12.1 hrs

MODIFIED PULS BASIN ROUTING FOR BASIN 6. - "BASIN 6. - PHASE III

INFLOW HYDROGRAPH FILENAME: B:B_107R.HYD
BASIN STORAGE/ELEVATION DATA FILENAME: B:BASIN2.DS
OUTLET STRUCTURE DISCHARGE/ELEVATION DATA FILENAME: B:BASIN2.DO

TIME hrs.	HYDROGRAPH INFLOW,cfs	BASIN INFLOW,cfs	STORAGE acre-ft	ELEVATION ft.ABOVE msl	BASIN OUTFLOW,cfs	OUTFLOW TOTAL,cfs	RUNOFF TIME
1100.00	3.40	3.40	0.000	460.00	0.00	0.00	
1100.10	3.80	3.80	0.030	460.43	0.00	0.00	
1100.20	4.30	4.30	0.069	460.90	0.00	0.00	
1100.30	4.70	4.70	0.100	461.43	0.00	0.00	
1100.40	5.60	5.60	0.143	462.01	0.00	0.00	
1100.50	6.50	6.50	0.193	462.13	0.00	0.00	
1100.60	7.30	7.30	0.250	462.27	0.00	0.00	
1100.70	19.10	19.10	0.359	462.53	0.00	0.00	
1100.80	30.90	30.90	0.565	463.02	0.00	0	
1100.90	42.60	42.60	0.869	463.76	0.00	0.00	
1101.00	83.00	83.00	1.386	464.54	0.00	0	
1101.10	134.50	134.50	2.296	465.70	0.14	0.14	
1101.20	99.10	99.10	3.348	466.77	0.60	0.60	
1101.30	44.10	44.10	3.834	467.38	0.77	0.77	
1101.40	26.60	26.60	4.119	467.68	0.87	0.87	
1101.50	20.20	20.20	4.305	467.89	0.93	0.93	
1101.60	16.40	16.40	4.449	468.03	0.98	0.98	
1101.70	13.40	13.40	4.564	468.13	1.01	1.01	
1101.80	11.60	11.60	4.659	468.22	1.04	1.04	
1101.90	10.80	10.80	4.742	468.30	1.06	1.06	
1102.00	9.90	9.90	4.819	468.37	1.08	1.08	
1102.10	9.20	9.20	4.889	468.44	1.10	1.10	
1102.20	8.60	8.60	4.955	468.50	1.12	1.12	
1102.30	8.10	8.10	5.013	468.56	1.14	1.14	
1102.40	7.60	7.60	5.068	468.61	1.15	1.15	

TOTAL ROUTING MASS BALANCE DISCREPANCY= -.09

PEAK INFLOW = 134.50 cfs. PEAK OUTFLOW = 0.00 cfs.

ROUTING TIME STEP = 0.10 hours NUMBER OF OUTFLOW HYDROGRAPH POINTS =

USGS MODEL <3-B> - SCS TR-55 TABULAR METHOD

WATERSHED TITLE: BASIN 1

25 YR. STORM: PRECIPITATION = 5.70 in.

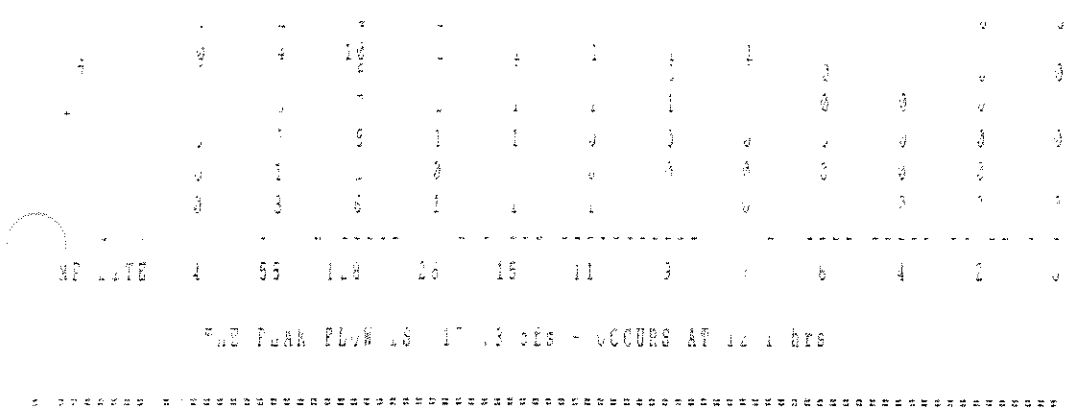
SUMMARY OF INPUT PARAMETERS

SUBAREA	AREA (sq mi)	CURVE NUMBER	IA/P	RUNOFF (in)	TC (hrs)	ADJ. TC (hrs)	TT (hrs)	ADJ. TT (hrs)
1	0.10	80	0.100	3.53	0.190	0.200	0.000	0.000
2	0.05	80	0.100	3.53	0.100	0.100	.000	0.000
3	0.002	80	0.100	3.53	0.100	0.200	0.000	0.000
4	0.02	80	0.100	3.53	0.070	0.100	0.000	0.000
5	0.001	80	0.100	3.53	0.050	0.100	0.000	0.000
	0.1	90	0.100	3.53	0.070	0.100	0.000	0.000
	0.	80	0.100	3.53	0.040	0.100	0.000	0.000
	4	85	0.100	3.53	0.070	0.100	0.000	0.000
		3	0.100	3.53	0 30	0.100	0.000	0.000
	1	5.	0.100	3.53	0.090	0.100	0.000	0.000
6		59	0.100	3.53	0.030	0.100	0. 00	0.000
	0	9	0.100	3.53	0.040	.100	0.000	0.000
7	0.01	85	0.100	3.53	0.060	0.100	0 000	0 000
8	0 3	30	0 100	3.53	0.080	0.100	0.00	0 000
9	00	80	.100	3 53	0 100	0.100	0.000	0.000
10	0 001	83	0 100	3.53	0.120	0.100	0.000	0.010
	0.002	80	0.100	3 53	0.030	0.100	0.000	0.000
11	20	90	0 10	0.53	0 120	0 100	0.000	0.00
		95	0 100	3 00	0.090	0 100	0 000	0 000
	0 001	87	0 100	3.52	0 090	0.1 0	0.000	0.000
12	0. 0	80	0.100	3.53	0.111	0 100	0.00	0 010
JUNCTION	0. 5	80		3.53				

INDIVIDUAL SUBAREA & COMPOSITE HYDROGRAPHS

TIME (hrs)											
0. 0	1.0	10.0	10.5	10.0	10.5	1. 0	11 0	11.0	11.0	12.0	12.0
	0	34	7	4	2	1	1	1	1	0	0
	0	11	2	1	1	1	1	1	0	0	0
	1		1	1	0	0	0	0	0	0	0
1	1	4	1	1	0	0	0	0	0	0	0
	1	3	1	0	0	0	0		0	0	0
0	1	1	0	0	0	0	0	0	0	0	0
0	1	1	0		0	0	0	0		0	0
0	0	3		1	1	1	0	0	0	0	0
0	0	1	0	0	0	0	0	0	0	0	0
	1	1		0	0	0	0	0	0	0	0
1			1	1	1	0		0	0	0	0
0		0		0			0				

G-12



THE PEAK FLOW IS 17.3 CFS - OCCURS AT 12.1 HRS

MODIFIED PULS BASIN ROUTING FOR BASIN #2---BASIN 6 - PHASE II.

INFLOW HYDROGRAPH FILENAME: B:B_6YR.HYD
BASIN STORAGE/ELEVATION DATA FILENAME: B:BASIN_6S
OUTLET STRUCTURE DISCHARGE ELEVATION DATA FILENAME: B:BASIN_6D

TIME hrs.	HYDROGRAPH INFLOW,cfs	BASIN INFLOW,cfs	STORAGE acre-ft	ELEVATION ft.ABOVE msl	BASIN OUTFLOW,cfs	OUTFLOW,cfs	S
1100.00	4.40	4.40	0.000	460.00	0.00		
1100.10	5.00	5.00	0.039	460.55	0.00		
1100.20	5.60	5.60	0.083	461.13	0.00		
1100.30	6.20	6.20	0.131	461.88	0.00		
1100.40	7.30	7.30	0.187	462.11	0.00		
1100.50	8.50	8.50	0.255	462.37	0.00		
1100.60	9.60	9.60	0.327	462.45	0.00		
1100.70	24.80	24.80	0.469	462.79	0.00		
1100.80	40.10	40.10	0.738	463.44	0.00		
1100.90	55.30	55.30	1.132	464.21	0.00		
1101.00	107.10	107.10	1.303	465.07	0.00		
1101.10	173.30	173.30	1.960	466.46	0.00		
1101.20	127.70	127.70	4.198	467.17	0.39		
1101.30	57.70	56.10	4.951	468.50	1.14		
1101.40	34.10	34.10	5.31	468.84	1.23		
1101.50	25.80	25.80	5.554	469.06	1.31		
1101.60	21.00	21.00	5.730	469.24	1.36		
1101.70	17.20	17.20	5.883	469.37	1.41		
1101.80	14.90	14.90	6.003	469.47	1.45		
1101.90	13.80	13.80	6.110	469.59	1.48		
1102.00	12.60	12.60	6.207	469.68	1.50		
1102.10	11.80	11.80	6.296	469.76	1.52		
1102.20	10.9	10.90	6.376	469.84	1.55		
1102.30	10.30	10.30	6.451	469.91	1.56		

TOTAL ROUTING MASS BALANCE DISCREPANCY= -.82 %

PEAK INFLOW = 173.30 cfs. PEAK OUTFLOW = 0.00 cfs.

ROUTING TIME STEP = 0.10 hours NUMBER OF OUTFLOW HYDROGRAPH POINTS =

MODIFIED PULS BASIN ROUTING FOR BASIN #2---BASIN #2 PHASE III

INFLOW HYDROGRAPH FILENAME: B:B2100YR.HYD
BASIN STORAGE ELEVATION DATA FILENAME: B:BASIN2.ES
OUTLET STRUCTURE DISCHARGE/ELEVATION DATA FILENAME: B:BASIN2.EO

TIME hrs.	HYDROGRAPH INFLOW,cfs	BASIN INFLOW,cfs	STORAGE acre-ft	ELEVATION ft.ABOVE msl	BASIN OUTFLOW,cfs	OUTFLOW TOTAL..fs	RES FLOW,
1100.00	6.00	6.00	0.000	460.00	0.00		
1100.10	6.80	6.80	0.053	460.76	0.00		
1100.20	7.60	7.60	0.11	461.61	0.00		
1100.30	8.40	8.40	0.179	462.09	0.30		
*1100.40	9.90	9.90	0.254	462.28	0.00		
*1100.50	11.40	11.40	0.342	462.49	.00		
*1100.60	12.90	12.90	.443	46 .73	0.00		
1100.70	33.50	33.50	0.634	463.19	0.00		
*1100.80	54.10	54.10	0.996	464.03	0.00		
*1100.90	74.60	74.60	1.523	464 72	0.00		
*1101 00	144.50	144.50	3.493	466 99	0.00		
*1101 10	233.70	233.70	5.991	467.55	0.00		
*1101.20	172.20	172.20	5.659	469.16	1.34		
1101.30	76.50	76.50	5.675	470.10	1.64		
*1101.40	46.00	46.00	7.157	470.5	1.70		
11 1 50	34.80	34.80	7.495	470.79	1.80		
1101.60	29.40	29.40	7.751	470.99	1.92		
.101 70	23.10	23.10	7 919	471.15	1.11		
1101.80	20.10	20.10	8.054	471.26	0.96		
*1101.90	18.60	18.60	8.154	471.35	0.94		
1102.00	17.00	17.00	8.25	471.41	0.9		
1102 10	15.90	15 90	8 70	471 45	11 61		
1102 20	14.3	14.30	8.299	471.47	12 55		
*11 2.30	14.3	14.00	8 31	471.48	13.05		

TOTAL ROUTING MASS BALANCE DISCREPANCY= - 3 %

PEAK INFLOW = 233 70 cfs PEAK OUTFLOW = 13 05 cfs.

ROUTING TIME STEP = 0.10 hours NUMBER OF OUTFLOW HYDROGRAPH POINTS =

PATH MODULE <3-B> - SCS TR-55 TABULAR METHOD

WATERSHED TITLE: BASIN 4.

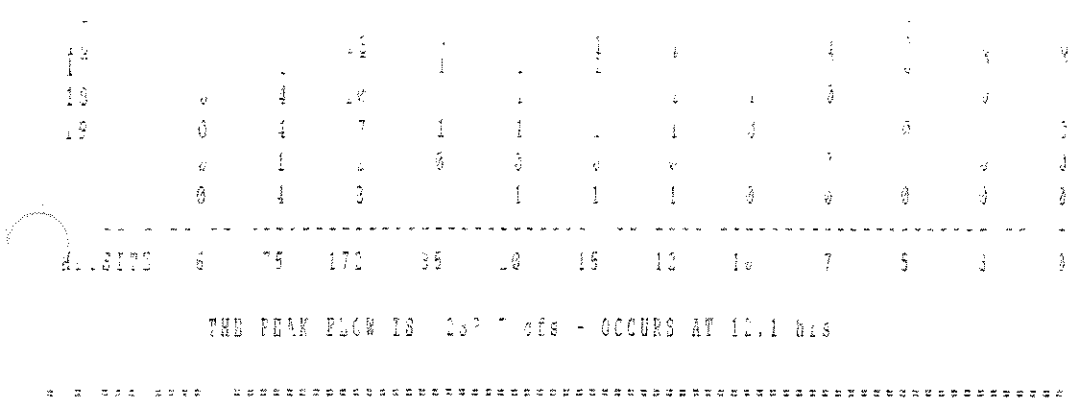
100 YR STORM: PRECIPITATION = [illegible] in

SUMMARY OF INPUT PARAMETERS

SUBAREA	AREA sqmi	CURVE NUMBER	IA/P	RUNOFF (in)	TC (hrs)	ADJ. TC (hrs)	TT (hrs)	ADJ. TT (hrs)
[illegible]	[illegible]	80	0.100	4.76	0.190	0.200	0.000	0.000
[illegible]	[illegible]	80	0.100	4.76	0.100	0.100	0.000	0.000
[illegible]	[illegible]	80	0.100	4.76	0.180	0.200	0.000	0.000
[illegible]	[illegible]	80	0.100	4.76	0.070	0.100	0.000	0.000
[illegible]	[illegible]	80	0.100	4.76	0.050	0.100	0.000	0.000
[illegible]	[illegible]	80	0.100	4.76	0.070	0.100	0.000	0.000
[illegible]	[illegible]	80	0.100	4.76	0.040	0.100	0.000	0.000
[illegible]	[illegible]	80	0.100	4.76	0.070	0.100	0.000	0.000
[illegible]	[illegible]	80	0.100	4.76	0.030	0.100	0.000	0.000
[illegible]	[illegible]	80	0.100	4.76	0.090	0.100	0.000	0.000
[illegible]	[illegible]	80	0.100	4.76	0.084	0.100	0.000	0.000
[illegible]	[illegible]	80	0.100	4.76	0.040	0.100	0.000	0.000
[illegible]	[illegible]	80	0.100	4.76	0.360	0.400	0.000	0.000
[illegible]	[illegible]	80	0.100	4.76	0.080	0.100	0.000	0.000
[illegible]	[illegible]	80	0.100	4.76	0.100	0.100	0.000	0.000
[illegible]	[illegible]	80	0.100	4.76	0.120	0.100	0.000	0.000
[illegible]	[illegible]	80	0.100	4.76	0.000	0.100	0.000	0.000
[illegible]	[illegible]	80	0.100	4.76	0.120	0.100	0.000	0.000
[illegible]	[illegible]	80	0.100	4.76	0.000	0.100	0.000	0.000
[illegible]	[illegible]	80	0.100	4.75	0.020	0.100	0.000	0.000
[illegible]	[illegible]	80	0.100	4.76	0.110	0.100	0.000	0.010
[illegible]	[illegible]	80		4.76				

INDIVIDUAL SUBAREA & COMPOSITE HYDROGRAPHS

[illegible]	TIME (hrs)										
	[illegible]	11.9	12.0	12.5	12.8	13.2	13.6	14.0	15.0	17.0	20.0	26.0
[illegible]	1	12	46	9	5	3	3	2	2	1	1	0
[illegible]	1	5	15	3	[illegible]	1	1	1	1	0	0	0
[illegible]	0	1	3	2	1	1	0	0	0	0	0	0
		[illegible]	6	1	[illegible]	1	0	0	0	0	0	0
[illegible]	0	1	4	1	0	0	0	0	0	0	0	0
		1	3	1	0	0	0	0	0	0	0	0
		[illegible]	3	1	0	[illegible]	0	0		0	0	0
[illegible]	0	0	11	[illegible]	1	1	1	1	1	0	[illegible]	0
[illegible]		0	1	3	0	0	0	0	0	0	[illegible]	0
[illegible]			1	[illegible]	0		0	[illegible]				
[illegible]	[illegible]	4	3	[illegible]	1	1	[illegible]	0	0	0	0	
[illegible]			1			0				0	0	0



THE PEAK FLOW IS [illegible] cfs - OCCURS AT 12.1 hrs

IESI PA Bethlehem Landfill

Pre-Development

Basin #3

TAKEN FROM PHASE IV ANALYSIS

JMM

Martin & Martin, Inc.
37 S.Main St. Suite A
Chambersburg, PA 17201

Phone: 717-264-6759
Email: martinmartin@innernet.net

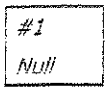
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	2 yr - 24 hr
Rainfall Depth:	3.200 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	End	0.000	0.000	Ex. Basin #3 Area



Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	13.500	13.500	9.46	0.88

Structure Detail:

Structure #1 (Null)

Ex. Basin #3 Area

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	13.500	0.159	0.000	0.000	69.000	F	9.46	0.877
	$\sum$	**13.500**						**9.46**	**0.877**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	20.00	260.00	1,300.00	3.570	0.101
		6. Grassed waterway	8.00	72.00	900.00	4.240	0.056
#1	**1**	**Time of Concentration:**					**0.159**

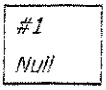
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 24 hr
Rainfall Depth:	4.830 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	End	0.000	0.000	Ex. Basin #3 Area



Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	13.500	13.500	22.76	2.06

Structure Detail:

Structure #1 (Null)

Ex. Basin #3 Area

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	13.500	0.159	0.000	0.000	69.000	F	22.76	2.064
	Σ	**13.500**						**22.76**	**2.064**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	20.00	260.00	1,300.00	3.570	0.101
		6. Grassed waterway	8.00	72.00	900.00	4.240	0.058
#1	**1**	**Time of Concentration:**					**0.159**

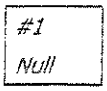
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	25 yr - 24 hr
Rainfall Depth:	5.720 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	End	0.000	0.000	Ex. Basin #3 Area



Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	13.500	13.500	31.02	2.81

Structure Detail:

Structure #1 (Null)

Ex. Basin #3 Area

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	13.500	0.159	0.000	0.000	69.000	F	31.02	2.808
	Σ	**13.500**						**31.02**	**2.808**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	20.00	260.00	1,300.00	3.570	0.101
		6. Grassed waterway	8.00	72.00	900.00	4.240	0.058
#1	**1**	**Time of Concentration:**					**0.159**

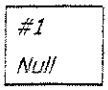
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	100 yr - 24 hr
Rainfall Depth:	7.070 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	End	0.000	0.000	Ex. Basin #3 Area



Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	13.500	13.500	44.27	4.02

Structure Detail:

Structure #1 (Null)

Ex. Basin #3 Area

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	13.500	0.159	0.000	0.000	69.000	F	44.27	4.018
	Σ	**13.500**						**44.27**	**4.018**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	20.00	260.00	1,300.00	3.570	0.101
		6. Grassed waterway	8.00	72.00	900.00	4.240	0.058
#1	**1**	**Time of Concentration:**					**0.159**

IESI PA Bethlehem Landfill

Pre-Development

Basin #4

TAKEN FROM PHASE III ANALYSIS

JMM

Martin & Martin, Inc.
37 S.Main St. Suite A
Chambersburg, PA 17201

Phone: 717-264-6759
Email: martinmartin@innernet.net

****
* PSUHM: MODULE <3-B> - SCS TR-55 TABULAR METHOD *
****

WATERSHED TITLE: BASIN #4

2 YR. STORM: PRECIPITATION = 3.2 in.

==========

SUMMARY OF INPUT PARAMETERS

SUBAREA	AREA (sqmi)	CURVE NUMBER	IA/P	RUNOFF (in)	TC (hrs)	ADJ. TC (hrs)	TT (hrs)	ADJ. TT (hrs)
1	0.005	71	0.255	0.88	0.119	0.100	0.006	0.025
2	0.004	80	0.156	1.40	0.112	0.100	0.003	0.015
3	0.004	80	0.156	1.40	0.113	0.100	0.003	0.016
4	0.003	80	0.156	1.40	0.105	0.100	0.003	0.008
5	0.004	81	0.147	1.47	0.091	0.100	0.005	0.000
6	0.003	80	0.156	1.40	0.100	0.100	0.004	0.004
7	0.004	80	0.156	1.40	0.095	0.100	0.004	0.000
8	0.006	80	0.156	1.40	0.110	0.100	0.025	0.035
9	0.004	81	0.147	1.47	0.098	0.100	0.008	0.006
10	0.005	80	0.156	1.40	0.145	0.100	0.008	0.053
11	0.011	62	0.383	0.48	0.074	0.100	0.000	0.000
COMPOSITE	0.053	75		1.17				

INDIVIDUAL SUBAREA & COMPOSITE HYDROGRAPHS

SUBAREA	TIME (hrs) 11.0	11.9	12.2	12.5	12.8	13.2	13.6	14.0	15.0	17.0	20.0	26.0
1	0	1	3	1	0	0	0	0	0	0	0	0
2	0	1	3	1	0	0	0	0	0	0	0	0
3	0	1	3	1	0	0	0	0	0	0	0	0
4	0	1	3	1	0	0	0	0	0	0	0	0
5	0	2	4	1	0	0	0	0	0	0	0	0
6	0	1	3	1	0	0	0	0	0	0	0	0
7	0	1	3	1	0	0	0	0	0	0	0	0
8	0	2	5	1	1	1	0	0	0	0	0	0
9	0	2	4	1	0	0	0	0	0	0	0	0
10	0	1	5	1	1	0	0	0	0	0	0	0
11	0	0	2	1	1	0	0	0	0	0	0	0
COMPOSITE	1	14	38	9	5	4	3	3	2	1	1	0

THE PEAK FLOW IS 54.4 cfs - OCCURS AT 12.1 hrs

==========

Penn State Urban Hydrology Model
MODULE <4-B> - MODIFIED PULS ROUTING

Name of reservoir or channel: BASIN 4 PHASE III
Filename of inflow hydrograph: B:2YRBASIN.HYD
Filename of rating matrix: B:BASIN4.ESO

Date	Time	Inflow (cfs)	I1+I2 (cfs)	2ST/DT-O (cfs)	2ST/DT+O (cfs)	Outflow (cfs)	Storage (AcFt)	Elevation (ft MSL)
		1.0	2.2	0.0	0.0	0.1	2.28	434.50
00/00/0	0012	1.2	2.8	2.1	2.2	0.1	2.30	434.50
00/00/0	0024	1.6	3.7	4.8	4.9	0.1	2.30	434.50
00/00/0	0036	2.1	12.9	8.4	8.5	0.1	2.30	434.50
00/00/0	0048	10.8	45.4	21.2	21.3	0.1	2.30	434.50
00/00/0	0100	34.6	74.7	66.5	66.6	0.1	2.30	434.50
00/00/0	0112	40.1	52.4	141.1	141.2	0.1	2.30	434.50
00/00/0	0124	12.3	20.1	193.4	193.5	0.1	2.30	434.50
00/00/0	0136	7.8	13.5	213.4	213.5	0.1	2.30	434.50
00/00/0	0148	5.7	10.6	226.8	226.9	0.1	2.30	434.50
00/00/0	0200	4.9	9.2	237.3	237.4	0.1	2.30	434.50
00/00/0	0212	4.3	8.1	246.4	246.5	0.1	2.30	434.50
00/00/0	0224	3.8	7.3	254.4	254.5	0.1	2.30	434.50
00/00/0	0236	3.5	6.8	261.6	261.7	0.1	2.30	434.50
00/00/0	0248	3.3	6.6	268.3	268.4	0.1	2.30	434.50
00/00/0	0300	3.3	6.6	274.8	274.9	0.1	2.30	434.50
00/00/0	0312	3.3	6.6	281.3	281.4	3.3	2.30	434.56

Peak inflow = 40 cfs occurred at 0112 on 00/00/0
Peak outflow = 3 cfs occurred at 0312 on 00/00/0
Number of hydrograph points = 16
Time step = .2 hrs.
Change in storage = 2.28 ac.ft.
Summation of DT * (INFLOW - OUTFLOW) = 2.3

****
* PSUHM: MODULE <3-B> - SCS TR-55 TABULAR METHOD *
****

WATERSHED TITLE: BASIN #4-10YR

10 YR. STORM: PRECIPITATION = 4.83 in.

==========

SUMMARY OF INPUT PARAMETERS

SUBAREA	AREA (sqmi)	CURVE NUMBER	IA/P	RUNOFF (in)	TC (hrs)	ADJ. TC (hrs)	TT (hrs)	ADJ. TT (hrs)
1	0.005	71	0.169	1.99	0.119	0.100	0.006	0.025
2	0.004	80	0.104	2.75	0.112	0.100	0.003	0.015
3	0.004	80	0.104	2.75	0.113	0.100	0.003	0.016
4	0.003	80	0.104	2.75	0.105	0.100	0.003	0.008
5	0.004	81	0.100	2.84	0.091	0.100	0.005	0.000
6	0.003	80	0.104	2.75	0.100	0.100	0.004	0.004
7	0.004	80	0.104	2.75	0.095	0.100	0.004	0.000
8	0.006	80	0.104	2.75	0.110	0.100	0.025	0.035
9	0.004	81	0.100	2.84	0.098	0.100	0.008	0.006
10	0.005	80	0.104	2.75	0.145	0.100	0.008	0.053
11	0.011	62	0.254	1.33	0.074	0.100	0.000	0.000
COMPOSITE	0.053	75		2.39				

INDIVIDUAL SUBAREA & COMPOSITE HYDROGRAPHS

SUBAREA	TIME (hrs) 11.0	11.9	12.2	12.5	12.8	13.2	13.6	14.0	15.0	17.0	20.0	26.0
1	0	2	7	2	1	1	1	0	0	0	0	0
2	0	3	7	1	1	1	0	0	0	0	0	0
3	0	3	6	1	1	1	0	0	0	0	0	0
4	0	3	6	1	1	1	0	0	0	0	0	0
5	0	4	7	1	1	1	1	0	0	0	0	0
6	0	3	6	1	1	1	0	0	0	0	0	0
7	0	3	6	1	1	1	0	0	0	0	0	0
8	0	4	11	2	1	1	1	1	0	0	0	0
9	0	4	7	1	1	1	1	0	0	0	0	0
10	0	3	10	2	1	1	1	1	0	0	0	0
11	0	3	8	2	1	1	1	1	1	0	0	0
OMPOSITE	3	35	82	18	10	8	6	5	4	3	2	0

THE PEAK FLOW IS 115.8 cfs - OCCURS AT 12.1 hrs

==========

Penn State Urban Hydrology Model
MODULE <4-B> - MODIFIED PULS ROUTING

Name of reservoir or channel: BASIN #4 PHASE III
Filename of inflow hydrograph: B:10YRBAS4.HYD
Filename of rating matrix: B:BASIN4.ESO

Date	Time	Inflow (cfs)	I1+I2 (cfs)	2ST/DT-O (cfs)	2ST/DT+O (cfs)	Outflow (cfs)	Storage (AcFt)	Elevation (ft MSL)
		2.6	5.9	0.0	0.0	0.1	2.28	434.50
00/00/0	0012	3.3	7.6	5.8	5.9	0.1	2.30	434.50
00/00/0	0024	4.3	9.9	13.3	13.4	0.1	2.30	434.50
00/00/0	0036	5.6	30.8	23.1	23.2	0.1	2.30	434.50
00/00/0	0048	25.2	97.5	53.8	53.9	0.1	2.30	434.50
00/00/0	0100	72.3	154.0	151.2	151.3	0.1	2.30	434.50
00/00/0	0112	81.7	105.2	305.0	305.2	0.1	2.50	434.82
00/00/0	0124	23.5	38.0	409.5	410.2	0.4	3.40	435.94
00/00/0	0136	14.5	24.8	446.6	447.5	0.5	3.70	436.30
00/00/0	0148	10.3	19.1	470.3	471.4	0.5	3.90	436.52
00/00/0	0200	8.8	16.4	488.3	489.4	0.6	4.00	436.68
00/00/0	0212	7.6	14.4	503.5	504.7	0.6	4.20	436.82
00/00/0	0224	6.8	13.6	516.6	517.9	0.6	4.30	436.94
00/00/0	0236	6.8	13.6	528.9	530.2	0.7	4.40	437.05
00/00/0	0248	6.8	13.6	541.0	542.5	6.8	4.50	437.16

Peak inflow = 82 cfs occurred at 0112 on 00/00/0
Peak outflow = 7 cfs occurred at 0248 on 00/00/0
Number of hydrograph points = 14
Time step = .2 hrs.
Change in storage = 2.28 ac.ft.
Summation of DT * (INFLOW - OUTFLOW) = 4.5 ac.ft.

****
* PSUHM: MODULE <3-B> - SCS TR-55 TABULAR METHOD *
****

WATERSHED TITLE: BASIN #4 100YR

100 YR. STORM: PRECIPITATION = 7.07 in.

==========

SUMMARY OF INPUT PARAMETERS

SUBAREA	AREA (sqmi)	CURVE NUMBER	IA/P	RUNOFF (in)	TC (hrs)	ADJ. TC (hrs)	TT (hrs)	ADJ. TT (hrs)
1	0.005	71	0.116	3.78	0.119	0.100	0.006	0.025
2	0.004	80	0.100	4.76	0.112	0.100	0.003	0.015
3	0.004	80	0.100	4.76	0.113	0.100	0.003	0.016
4	0.003	80	0.100	4.76	0.105	0.100	0.003	0.008
5	0.004	81	0.100	4.87	0.091	0.100	0.005	0.000
6	0.003	80	0.100	4.76	0.100	0.100	0.004	0.004
7	0.004	80	0.100	4.76	0.095	0.100	0.004	0.000
8	0.006	80	0.100	4.76	0.110	0.100	0.025	0.035
9	0.004	81	0.100	4.87	0.098	0.100	0.008	0.006
10	0.005	80	0.100	4.76	0.145	0.100	0.008	0.053
11	0.011	62	0.173	2.85	0.074	0.100	0.000	0.000
COMPOSITE	0.053	75		4.28				

INDIVIDUAL SUBAREA & COMPOSITE HYDROGRAPHS

SUBAREA	TIME (hrs) 11.0	11.9	12.2	12.5	12.8	13.2	13.6	14.0	15.0	17.0	20.0	26.0
1	0	6	14	3	2	1	1	1	1	0	0	0
2	0	5	12	2	1	1	1	1	1	0	0	0
3	0	5	11	2	1	1	1	1	0	0	0	0
4	0	5	11	2	1	1	1	1	0	0	0	0
5	0	7	12	2	1	1	1	1	1	0	0	0
6	0	5	10	2	1	1	1	1	0	0	0	0
7	0	6	11	2	1	1	1	1	0	0	0	0
8	1	7	19	4	2	2	1	1	1	1	0	0
9	0	6	12	2	1	1	1	1	1	0	0	0
10	1	5	17	4	2	1	1	1	1	0	0	0
11	0	8	19	4	3	2	2	1	1	1	0	0
COMPOSITE	5	66	148	32	18	13	11	9	7	5	3	0

THE PEAK FLOW IS 209.1 cfs - OCCURS AT 12.1 hrs

==========

Penn State Urban Hydrology Model
MODULE <4-B> - MODIFIED PULS ROUTING

Name of reservoir or channel: BASIN #4 PHASE III
Filename of inflow hydrograph: B:100YRBAS.HYD
Filename of rating matrix: B:BASIN4.ESO

Date	Time	Inflow (cfs)	I1+I2 (cfs)	2ST/DT-O (cfs)	2ST/DT+O (cfs)	Outflow (cfs)	Storage (AcFt)	Elevation (ft MSL)
		5.0	11.4	0.0	0.0	0.1	2.28	434.50
00/00/0	0012	6.4	14.7	11.3	11.4	0.1	2.30	434.50
00/00/0	0024	8.3	19.2	25.9	26.0	0.1	2.30	434.50
00/00/0	0036	10.9	58.4	45.0	45.1	0.1	2.30	434.50
00/00/0	0048	47.5	178.7	103.3	103.4	0.1	2.30	434.50
00/00/0	0100	131.2	279.0	281.9	282.0	0.1	2.30	434.57
00/00/0	0112	147.8	189.4	559.3	560.9	0.8	4.60	437.33
00/00/0	0124	41.6	67.2	746.3	748.7	1.2	6.20	438.87
00/00/0	0136	25.6	43.8	810.9	813.5	1.3	6.70	439.36
00/00/0	0148	18.2	33.6	851.8	854.7	1.4	7.10	439.68
00/00/0	0200	15.4	28.7	882.4	885.4	1.5	7.30	439.90
00/00/0	0212	13.3	25.2	908.1	911.1	1.5	7.50	440.09
00/00/0	0224	11.9	23.8	925.8	933.3	3.7	7.70	440.23
00/00/0	0236	11.9	23.8	938.8	949.6	5.4	7.80	440.32
00/00/0	0248	11.9	23.8	949.2	962.6	11.9	7.90	440.40

Peak inflow = 148 cfs occurred at 0112 on 00/00/0
Peak outflow = 12 cfs occurred at 0248 on 00/00/0
Number of hydrograph points = 14
Time step = .2 hrs.
Change in storage = 2.28 ac.ft.
Summation of DT * (INFLOW - OUTFLOW) = 8 ac.

IESI PA Bethlehem Landfill

Phase IV

Pre-Development

BASIN #6 DISCHARGE RATES

TAKEN FROM PHASE IV ANALYSIS

JMM

Martin & Martin, Inc.
37 S. Main Street
Suite A
Chambersburg, PA 17201

Phone: 717-264-6759
Email: martinmartin@innernet.net

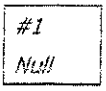
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	2 yr - 24 hr
Rainfall Depth:	3.200 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	End	0.000	0.000	Ex. Undetained Area



Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	10.000	10.000	9.04	0.65

Structure Detail:

Structure #1 (Null)

Ex. Undetained Area

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	10.000	0.093	0.000	0.000	69.000	F	9.04	0.650
	Σ	**10.000**						**9.04**	**0.650**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	40.00	260.00	650.00	5.050	0.035
		6. Grassed waterway	8.00	72.00	900.00	4.240	0.058
#1	**1**	**Time of Concentration:**					**0.093**

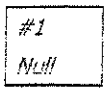
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 24 hr
Rainfall Depth:	4.830 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	End	0.000	0.000	Ex. Undetained Area



Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	10.000	10.000	20.38	1.53

Structure Detail:

Structure #1 (Null)

Ex. Undetained Area

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	10.000	0.093	0.000	0.000	69.000	F	20.38	1.529
	Σ	**10.000**						**20.38**	**1.529**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	40.00	260.00	650.00	5.050	0.035
		6. Grassed waterway	8.00	72.00	900.00	4.240	0.058
#1	**1**	**Time of Concentration:**					**0.093**

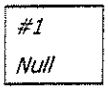
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	25 yr - 24 hr
Rainfall Depth:	5.720 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	End	0.000	0.000	Ex. Undetained Area



Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc. (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	10.000	0.093	0.000	0.000	69.000	F	27.11	2.080
	$\sum$	**10.000**						**27.11**	**2.080**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	40.00	260.00	650.00	5.050	0.035
		6. Grassed waterway	8.00	72.00	900.00	4.240	0.058
#1	**1**	**Time of Concentration:**					**0.093**

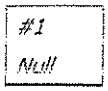
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	100 yr - 24 hr
Rainfall Depth:	7.040 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	End	0.000	0.000	Ex. Undetained Area



Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	10.000	10.000	37.45	2.96

Structure Detail:

Structure #1 (Null)

Ex. Undetained Area

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	10.000	0.093	0.000	0.000	89.000	F	37.45	2.956
	Σ	**10.000**						**37.45**	**2.956**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	40.00	260.00	650.00	5.050	0.035
		6. Grassed waterway	8.00	72.00	900.00	4.240	0.058
#1	**1**	**Time of Concentration:**					**0.093**

Bethlehem Landfill Southeast Realignment

AREA "A"

Pre-Development

JMM

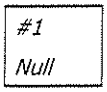
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	2 yr - 24 hr
Rainfall Depth:	3.000 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	End	0.000	0.000	Pre Dev. Area A



Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	6.370	6.370	0.23	0.08

Structure Detail:

Structure #1 (Null)

Pre Dev. Area A

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	6.370	0.395	0.000	0.000	55.000	M	0.23	0.083
	Σ	**6.370**						**0.23**	**0.083**

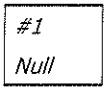
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	5 yr - 24 hr
Rainfall Depth:	3.600 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	End	0.000	0.000	Pre Dev. Area A



Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	6.370	6.370	0.79	0.16

Structure Detail:

Structure #1 (Null)

Pre Dev. Area A

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	6.370	0.395	0.000	0.000	55.000	M	0.79	0.161
	Σ	**6.370**						**0.79**	**0.161**

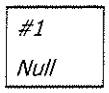
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 24 hr
Rainfall Depth:	4.560 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	End	0.000	0.000	Pre Dev. Area A



Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	6.370	6.370	2.14	0.33

Structure Detail:

Structure #1 (Null)

Pre Dev. Area A

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	6.370	0.395	0.000	0.000	55.000	M	2.14	0.326
	Σ	**6.370**						**2.14**	**0.326**

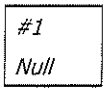
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	25 yr - 24 hr
Rainfall Depth:	5.520 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	End	0.000	0.000	Pre Dev. Area A



Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	6.370	6.370	3.89	0.53

Structure Detail:

Structure #1 (Null)

Pre Dev. Area A

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	6.370	0.395	0.000	0.000	55.000	M	3.89	0.530
	Σ	**6.370**						**3.89**	**0.530**

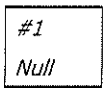
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	50 yr - 24 hr
Rainfall Depth:	6.480 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	End	0.000	0.000	Pre Dev. Area A



Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	6.370	6.370	5.93	0.76

Structure Detail:

Structure #1 (Null)

Pre Dev. Area A

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	6.370	0.395	0.000	0.000	55.000	M	5.93	0.763
	Σ	**6.370**						**5.93**	**0.763**

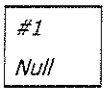
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	100 yr - 24 hr
Rainfall Depth:	7.440 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	End	0.000	0.000	Pre Dev. Area A



Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	6.370	6.370	8.22	1.02

Structure Detail:

Structure #1 (Null)

Pre Dev. Area A

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	6.370	0.395	0.000	0.000	55.000	M	8.22	1.021
	Σ	**6.370**						**8.22**	**1.021**

SECTION 10

Appendix H

Post Construction Watershed Calculations

Bethlehem Landfill Company

Sedimentation Basin #1
Post Development

Taken from ARIA Energy
East RNG Facility Development
(July 2019)

Hydrograph Return Period Recap

Hyd.	Hydrograph type (origin)	Inflow Hyd(s)	Peak Outflow (cfs)								Hydrograph description
			1-Yr	2-Yr	3-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	
1	SCS Runoff	-------	22.16	34.54	-------	47.77	70.58	94.21	118.25	142.46	Basin 1 Subarea 2
2	SCS Runoff	-------	2.79	4.72	-------	6.84	10.49	14.40	18.51	22.68	Basin 1 Subarea 1
3	SCS Runoff	-------	4.98	6.36	-------	7.73	9.92	12.09	14.25	16.41	Basin 1 Subarea 3
4	Combine	1, 2, 3	29.17	45.01	-------	61.98	90.54	120.09	150.13	180.41	Combined Discharge to Pro. Basin 1
5	Reservoir	4	0.70	0.87	-------	1.02	1.21	1.36	2.12	7.90	B1DA to Mod Basin 1

Hydrograph Summary Report

Hyd.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	22.16	2	720	51,340	----	------	------	Basin 1 Subarea 2
2	SCS Runoff	2.79	2	718	5,776	----	------	------	Basin 1 Subarea 1
3	SCS Runoff	4.98	2	716	10,892	----	------	------	Basin 1 Subarea 3
4	Combine	29.17	2	718	68,007	1, 2, 3	------	------	Combined Discharge to Pro. Basin 1
5	Reservoir	0.70	2	1032	67,967	4	437.60	42,552	B1DA to Mod Basin 1

Hydrograph Plot

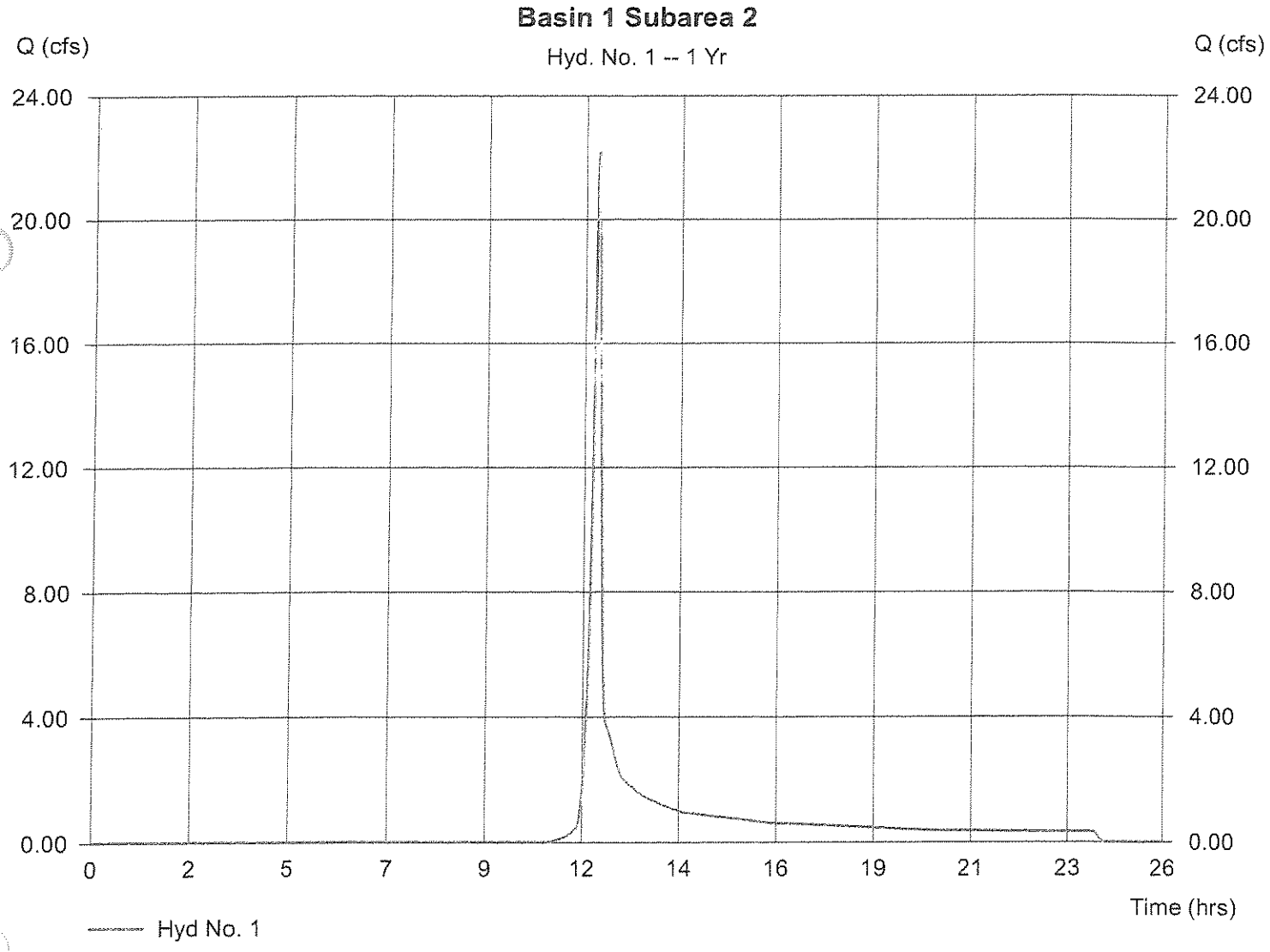
Hydraflow Hydrographs by Intelisolve | Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 1

Basin 1 Subarea 2

Hydrograph type	= SCS Runoff	Peak discharge	= 22.16 cfs
Storm frequency	= 1 yrs	Time interval	= 2 min
Drainage area	= 18.340 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 9.40 min
Total precip.	= 2.40 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 51,340 cuft



TR55 Tc Worksheet

Hyd. No. 1

Basin 1 Subarea 2

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.130		0.011		0.011		
Flow length (ft)	= 120.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.00		0.00		0.00		
Land slope (%)	= 33.00		0.00		0.00		
Travel Time (min)	**= 3.40**	**+**	**0.00**	**+**	**0.00**	**=**	**3.40**
Shallow Concentrated Flow							
Flow length (ft)	= 786.00		0.00		0.00		
Watercourse slope (%)	= 3.00		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	= 2.79		0.00		0.00		
Travel Time (min)	**= 4.69**	**+**	**0.00**	**+**	**0.00**	**=**	**4.69**
Channel Flow							
X sectional flow area (sqft)	= 4.50		3.53		0.00		
Wetted perimeter (ft)	= 6.50		4.71		0.00		
Channel slope (%)	= 33.00		33.00		0.00		
Manning's n-value	= 0.070		0.010		0.015		
Velocity (ft/s)	= 9.56		70.56		0.00		
Flow length (ft)	= 686.0		372.0		0.0		
Travel Time (min)	**= 1.20**	**+**	**0.09**	**+**	**0.00**	**=**	**1.28**

Total Travel Time, Tc ..... 9.40 min

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

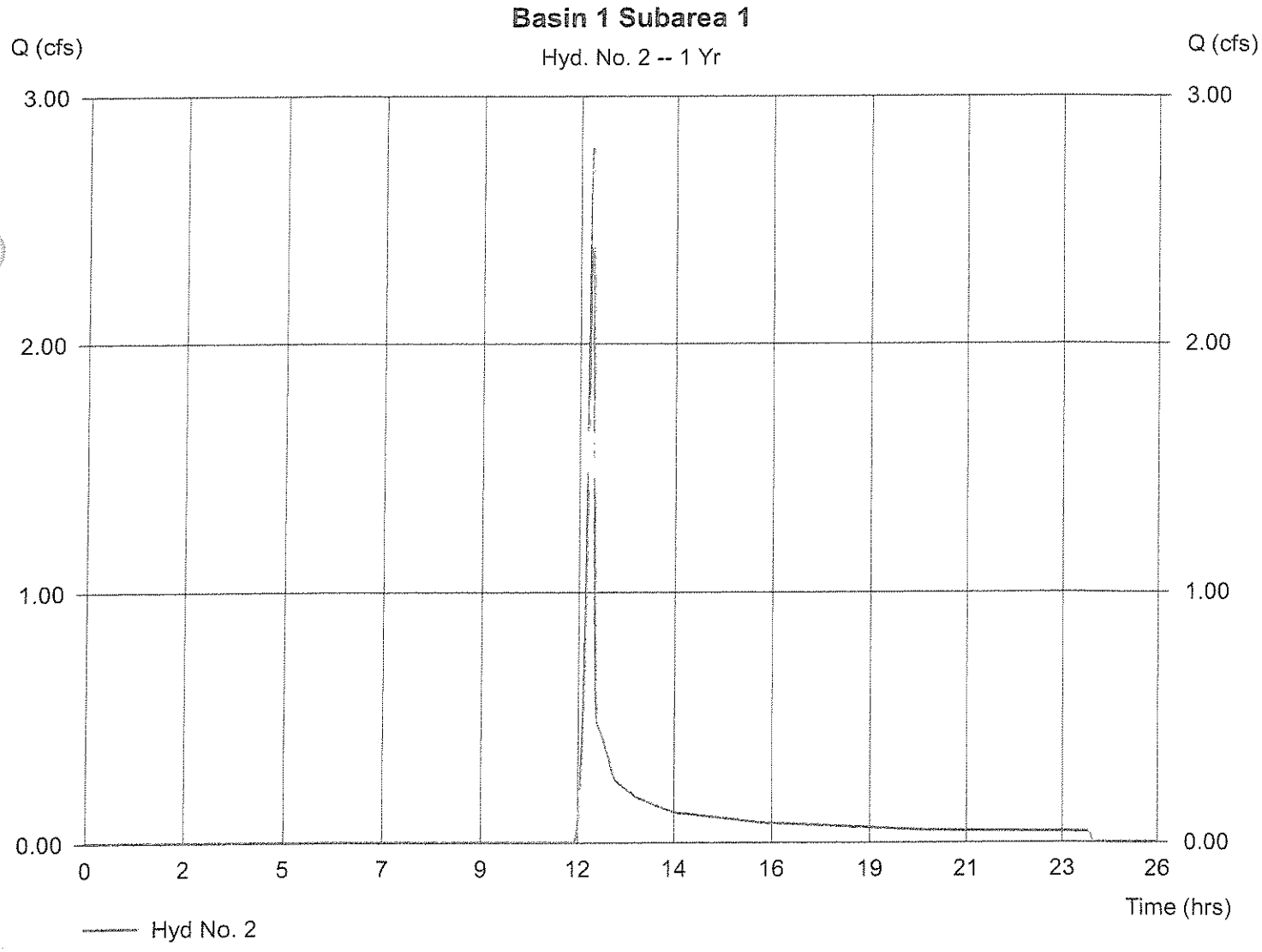
Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 2

Basin 1 Subarea 1

Hydrograph type	= SCS Runoff	Peak discharge	= 2.79 cfs
Storm frequency	= 1 yrs	Time interval	= 2 min
Drainage area	= 3.070 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.40 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 5,776 cuft



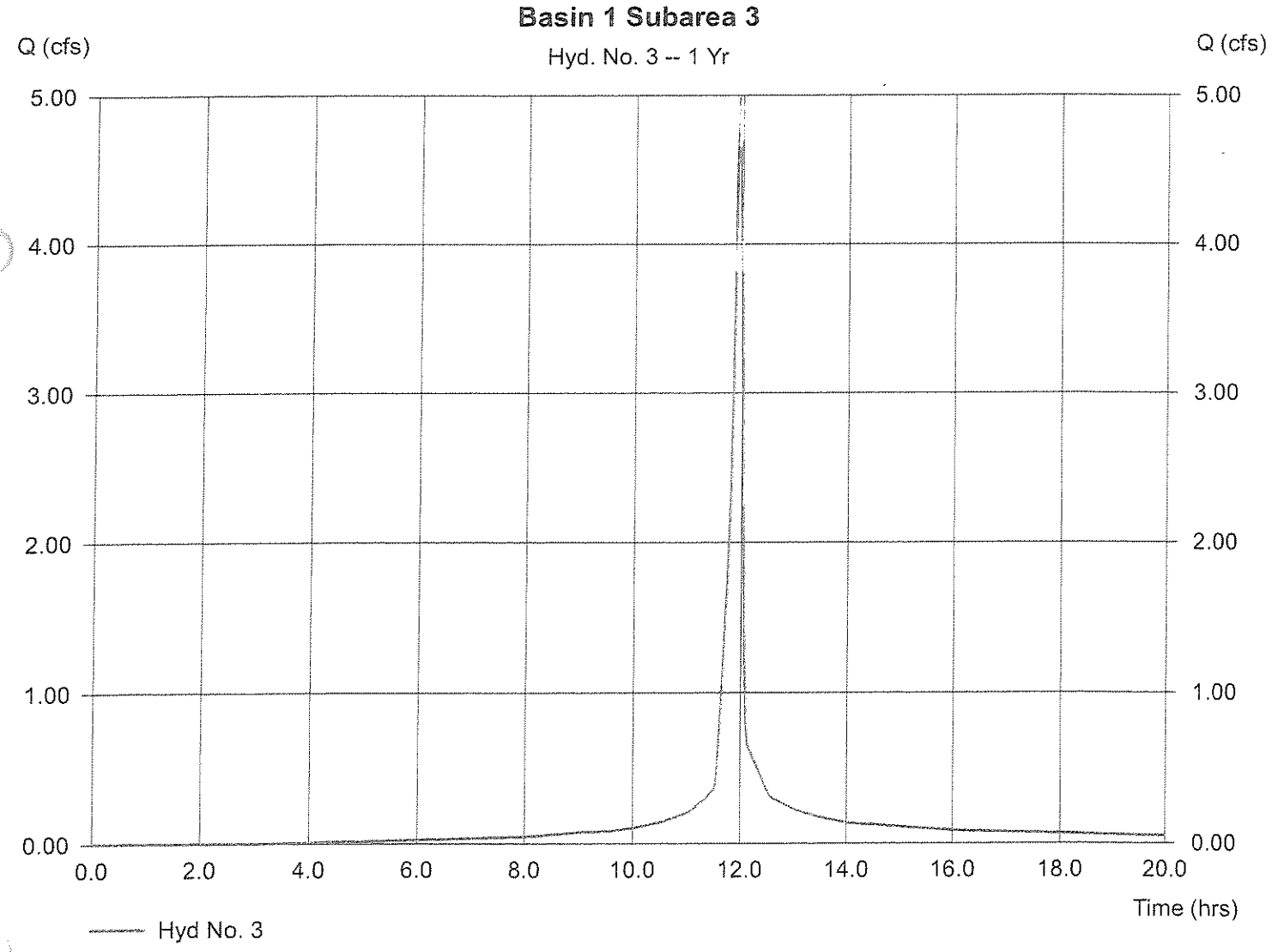
Hydrograph Plot

Hyd. No. 3

Basin 1 Subarea 3

Hydrograph type	= SCS Runoff	Peak discharge	= 4.98 cfs
Storm frequency	= 1 yrs	Time interval	= 2 min
Drainage area	= 1.630 ac	Curve number	= 96
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.40 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 10,892 cuft



Hydrograph Plot

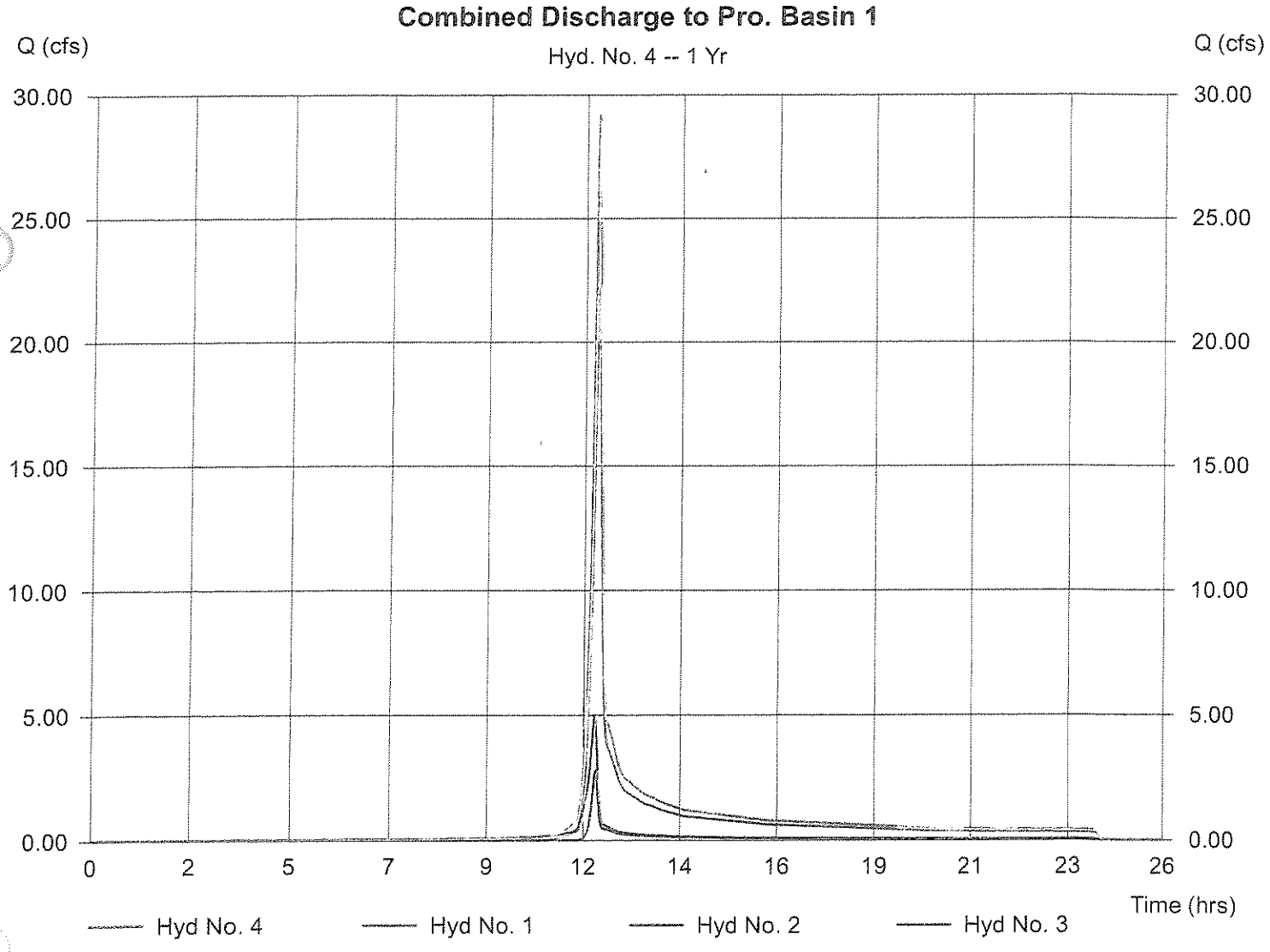
Hydraflow Hydrographs by Intelisolve | Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 4

Combined Discharge to Pro. Basin 1

Hydrograph type	= Combine	Peak discharge	= 29.17 cfs
Storm frequency	= 1 yrs	Time interval	= 2 min
Inflow hyds.	= 1, 2, 3		

Hydrograph Volume = 68,007 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Wednesday, Sep 4 2019, 6:47 PM

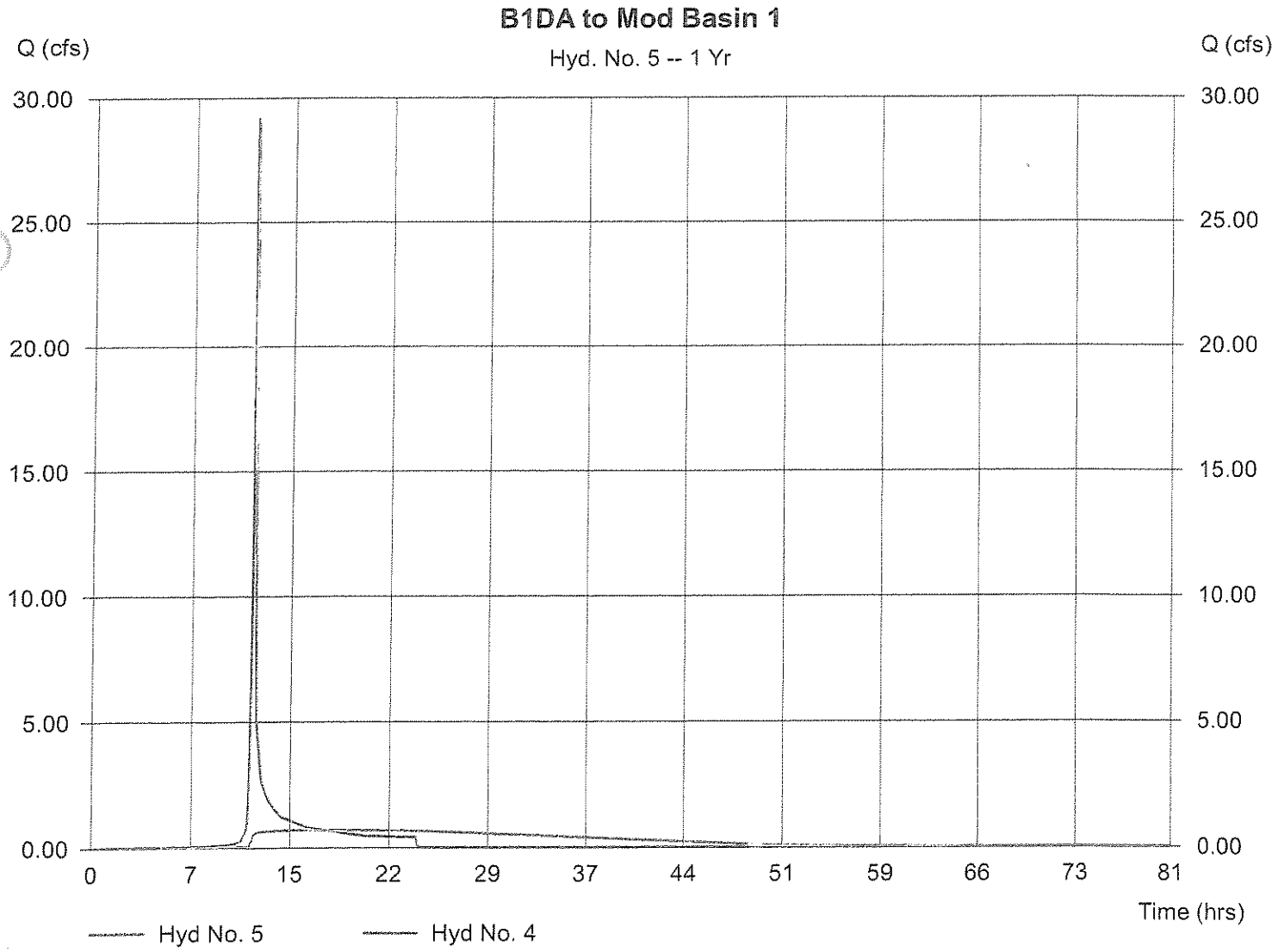
Hyd. No. 5

B1DA to Mod Basin 1

Hydrograph type	= Reservoir	Peak discharge	= 0.70 cfs
Storm frequency	= 1 yrs	Time interval	= 2 min
Inflow hyd. No.	= 4	Max. Elevation	= 437.60 ft
Reservoir name	= Pro. SW Basin 1 wPond	Max. Storage	= 42,552 cuft

Storage Indication method used.

Hydrograph Volume = 67,967 cuft



Pond Report

Hydraflow Hydrographs by Intelisolve — Wednesday, Sep 4 2019, 6:47 PM

Pond No. 1 - Pro. SW Basin 1 wPond

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	434.50	12,000	0	0
1.50	436.00	13,571	19,178	19,178
3.50	438.00	15,671	29,242	48,420
5.50	440.00	18,793	34,464	82,884
7.50	442.00	22,056	40,849	123,733
9.50	444.00	25,164	47,220	170,953
11.50	446.00	28,700	53,864	224,817
13.50	448.00	32,338	61,038	285,855
15.50	450.00	38,138	70,476	356,331

Culvert / Orifice Structures

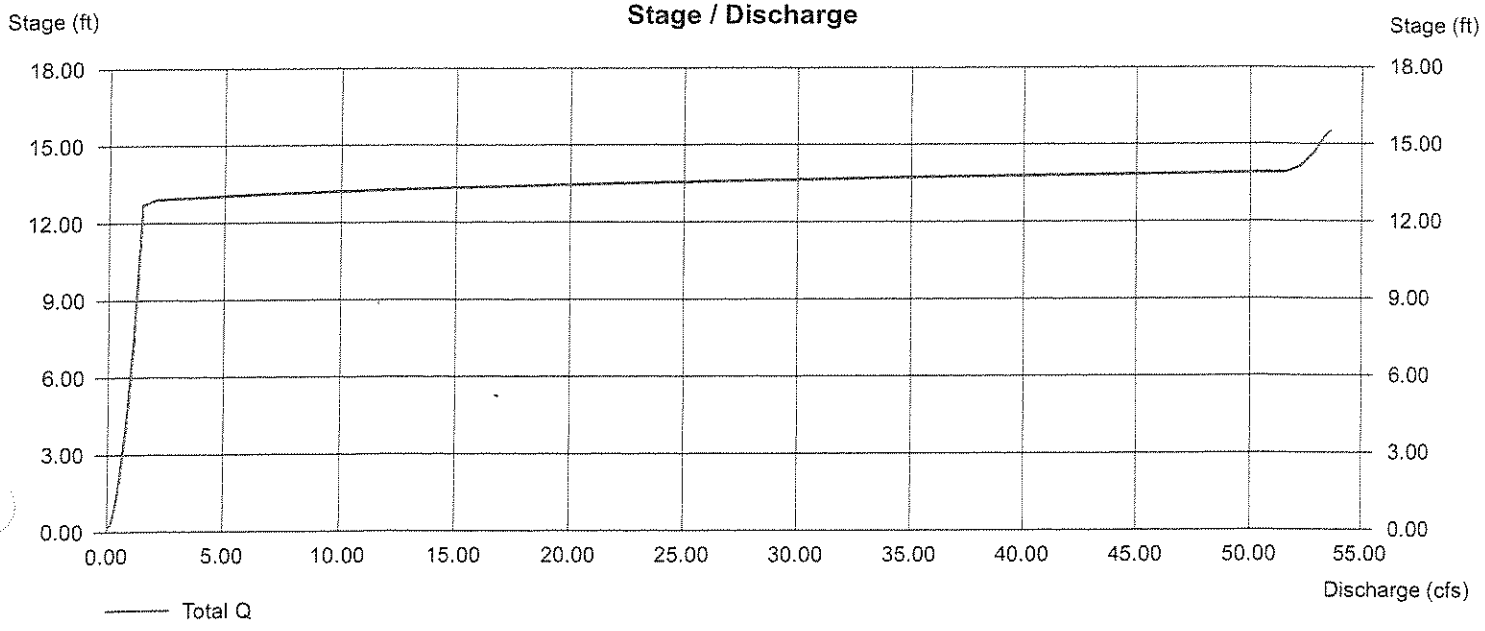
	[A]	[B]	[C]	[D]
Rise (in)	= 24.00	4.00	0.00	0.00
Span (in)	= 24.00	4.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 434.50	434.50	0.00	0.00
Length (ft)	= 110.00	0.00	0.00	0.00
Slope (%)	= 13.00	0.00	0.00	0.00
N-Value	= .024	.013	.013	.013
Orif. Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	Yes

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	30.00	0.00	0.00
Crest El. (ft)	= 447.34	448.13	0.00	0.00
Weir Coeff.	= 3.33	3.33	0.00	0.00
Weir Type	= Riser	Ciplti	---	---
Multi-Stage	= Yes	Yes	No	No

Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control. Weir riser checked for orifice conditions.



Hydrograph Summary Report

Hyd.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	34.54	2	720	79,121	----	------	------	Basin 1 Subarea 2
2	SCS Runoff	4.72	2	718	9,489	----	------	------	Basin 1 Subarea 1
3	SCS Runoff	6.36	2	716	14,157	----	------	------	Basin 1 Subarea 3
4	Combine	45.01	2	718	102,767	1, 2, 3	------	------	Combined Discharge to Pro. Basin 1
5	Reservoir	0.87	2	1090	102,669	4	439.20	69,012	B1DA to Mod Basin 1

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

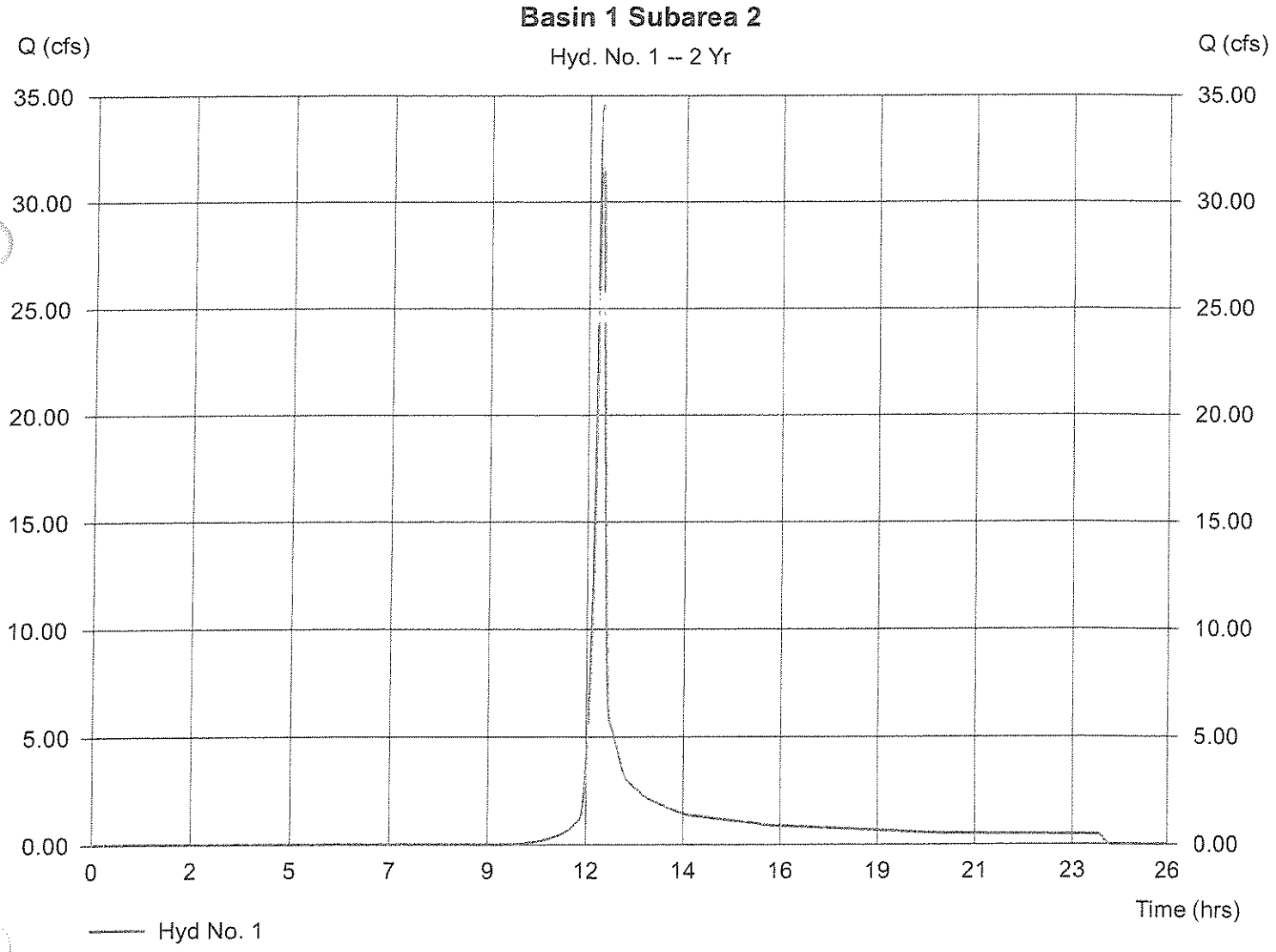
Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 1

Basin 1 Subarea 2

Hydrograph type	= SCS Runoff	Peak discharge	= 34.54 cfs
Storm frequency	= 2 yrs	Time interval	= 2 min
Drainage area	= 18.340 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 9.40 min
Total precip.	= 3.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 79,121 cuft



TR55 Tc Worksheet

Hyd. No. 1

Basin 1 Subarea 2

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.130		0.011		0.011		
Flow length (ft)	= 120.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.00		0.00		0.00		
Land slope (%)	= 33.00		0.00		0.00		
Travel Time (min)	**= 3.40**	**+**	**0.00**	**+**	**0.00**	**=**	**3.40**
Shallow Concentrated Flow							
Flow length (ft)	= 786.00		0.00		0.00		
Watercourse slope (%)	= 3.00		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	= 2.79		0.00		0.00		
Travel Time (min)	**= 4.69**	**+**	**0.00**	**+**	**0.00**	**=**	**4.69**
Channel Flow							
X sectional flow area (sqft)	= 4.50		3.53		0.00		
Wetted perimeter (ft)	= 6.50		4.71		0.00		
Channel slope (%)	= 33.00		33.00		0.00		
Manning's n-value	= 0.070		0.010		0.015		
Velocity (ft/s)	= 9.56		70.56		0.00		
Flow length (ft)	= 686.0		372.0		0.0		
Travel Time (min)	**= 1.20**	**+**	**0.09**	**+**	**0.00**	**=**	**1.28**

Total Travel Time, Tc ..... 9.40 min

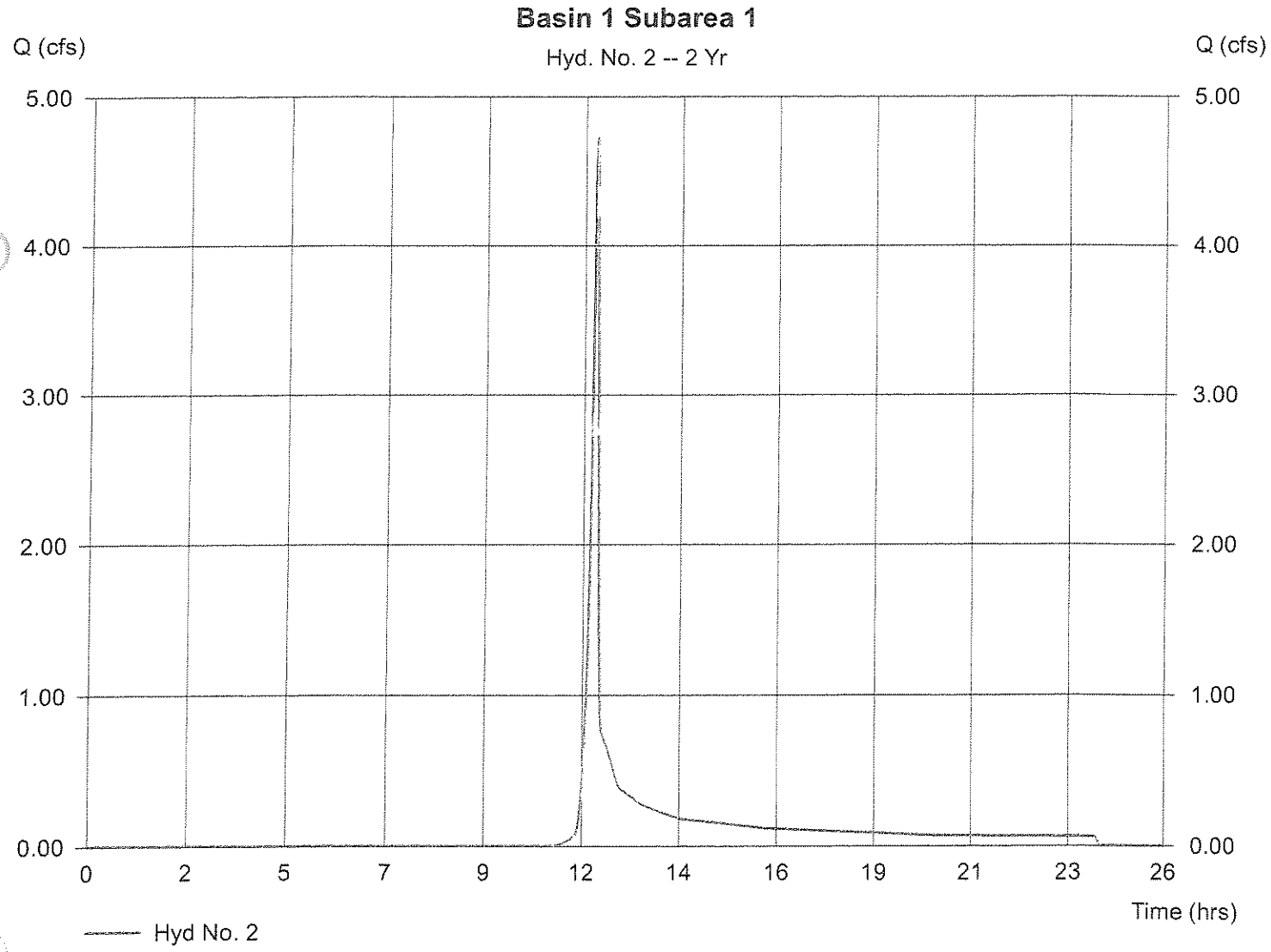
Hydrograph Plot

Hyd. No. 2

Basin 1 Subarea 1

Hydrograph type	= SCS Runoff	Peak discharge	= 4.72 cfs
Storm frequency	= 2 yrs	Time interval	= 2 min
Drainage area	= 3.070 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 9,489 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

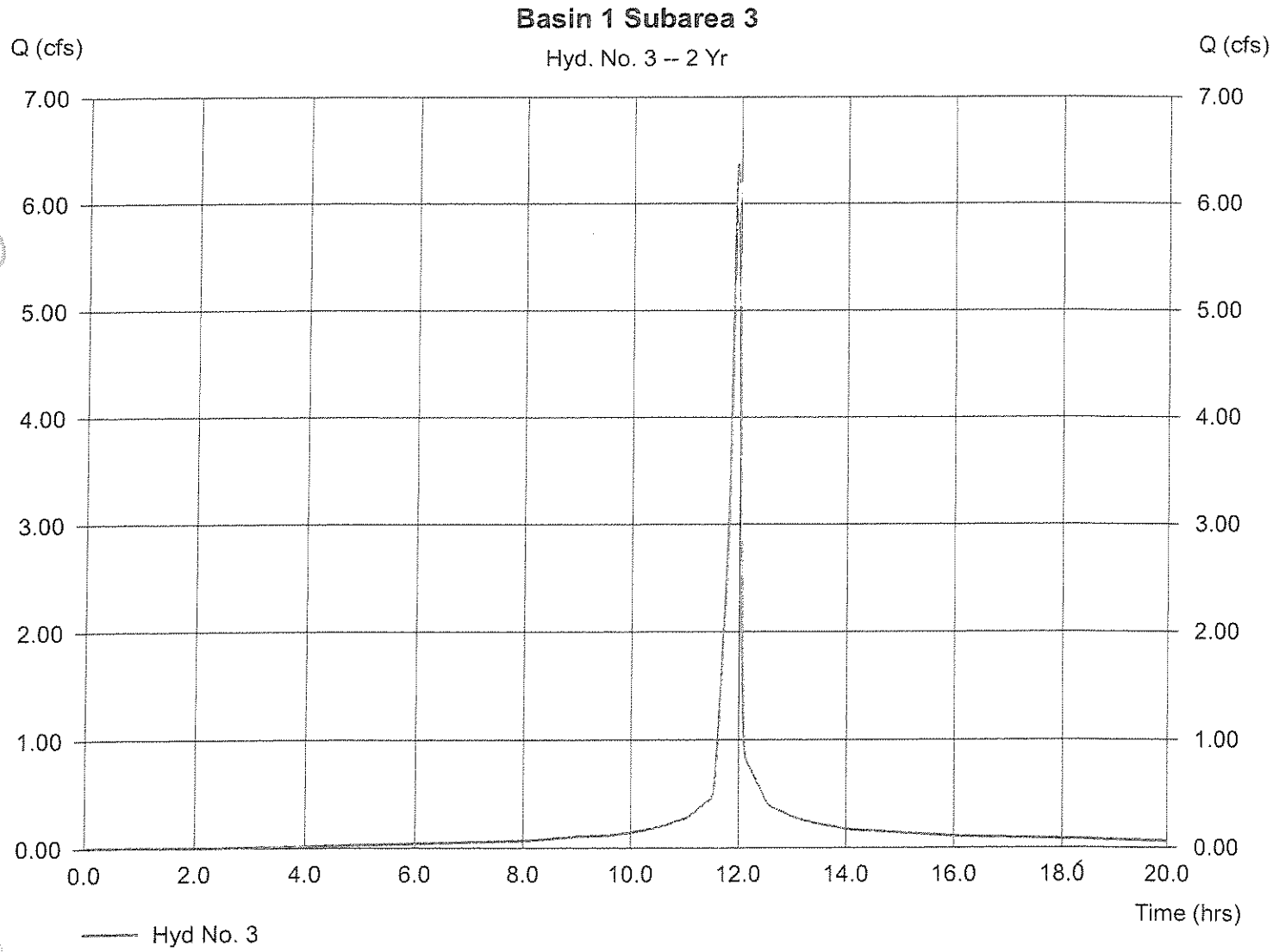
Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 3

Basin 1 Subarea 3

Hydrograph type	= SCS Runoff	Peak discharge	= 6.36 cfs
Storm frequency	= 2 yrs	Time interval	= 2 min
Drainage area	= 1.630 ac	Curve number	= 96
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 14,157 cuft



Hydrograph Plot

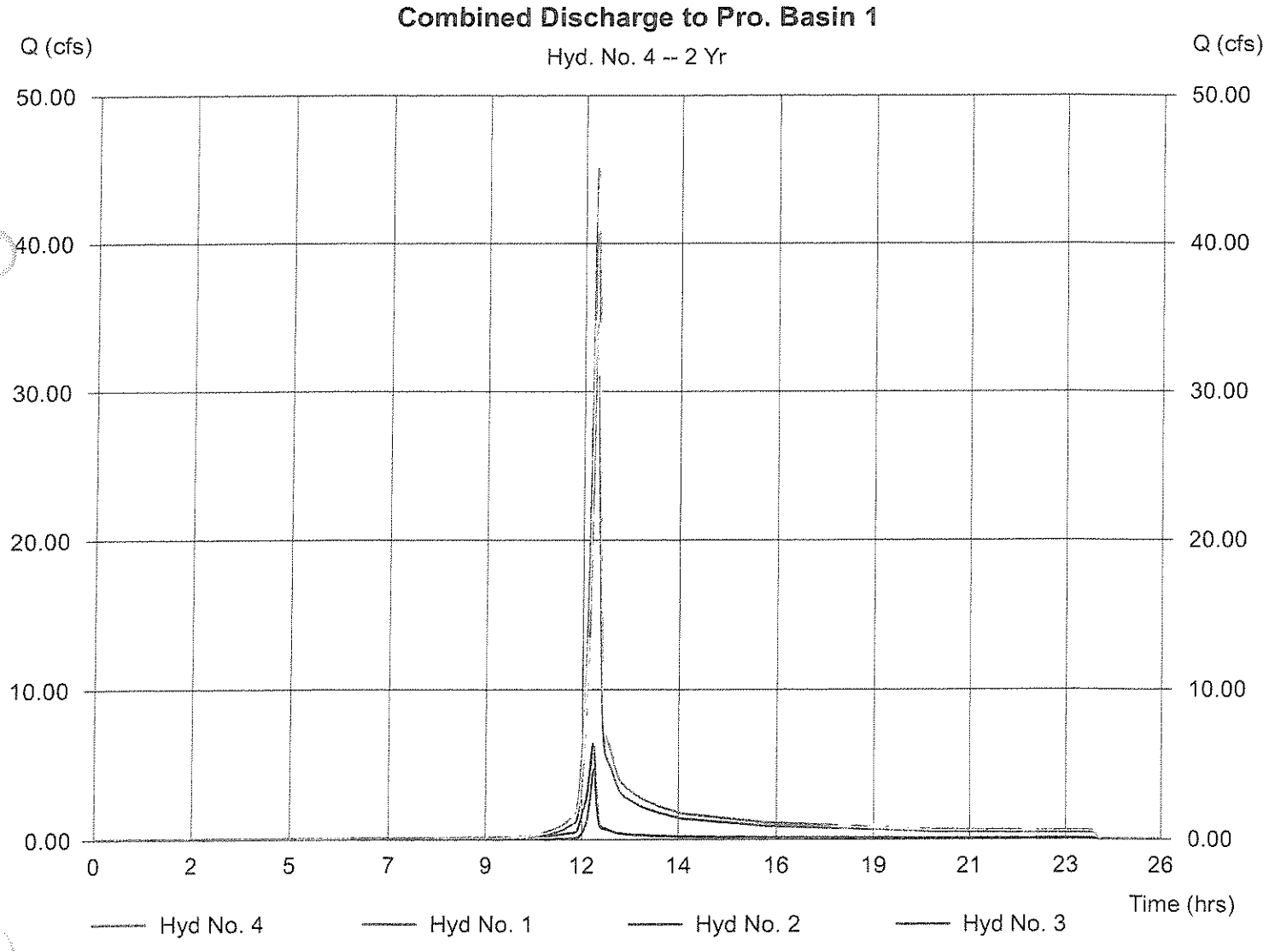
Hydraflow Hydrographs by Intelisolve | Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 4

Combined Discharge to Pro. Basin 1

Hydrograph type	= Combine	Peak discharge	= 45.01 cfs
Storm frequency	= 2 yrs	Time interval	= 2 min
Inflow hyds.	= 1, 2, 3		

Hydrograph Volume = 102,767 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Wednesday, Sep 4 2019, 6:47 PM

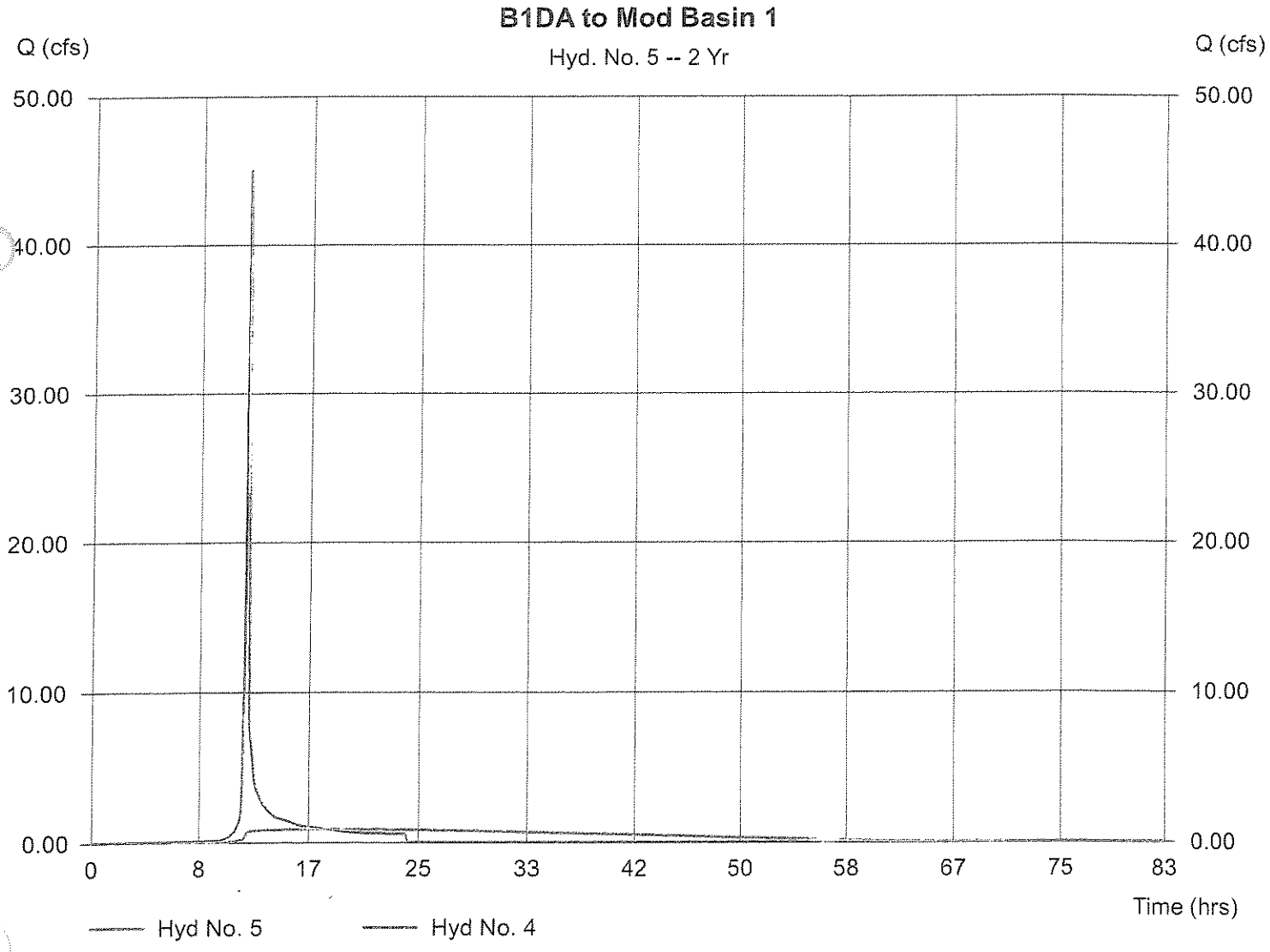
Hyd. No. 5

B1DA to Mod Basin 1

Hydrograph type	= Reservoir	Peak discharge	= 0.87 cfs
Storm frequency	= 2 yrs	Time interval	= 2 min
Inflow hyd. No.	= 4	Max. Elevation	= 439.20 ft
Reservoir name	= Pro. SW Basin 1 wPond	Max. Storage	= 69,012 cuft

Storage Indication method used.

Hydrograph Volume = 102,669 cuft



Pond Report

Hydraflow Hydrographs by Intelisolve — Wednesday, Sep 4 2019, 6:47 PM

Pond No. 1 - Pro. SW Basin 1 wPond

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	434.50	12,000	0	0
1.50	436.00	13,571	19,178	19,178
3.50	438.00	15,671	29,242	48,420
5.50	440.00	18,793	34,464	82,884
7.50	442.00	22,056	40,849	123,733
9.50	444.00	25,164	47,220	170,953
11.50	446.00	28,700	53,864	224,817
13.50	448.00	32,338	61,038	285,855
15.50	450.00	38,138	70,476	356,331

Culvert / Orifice Structures

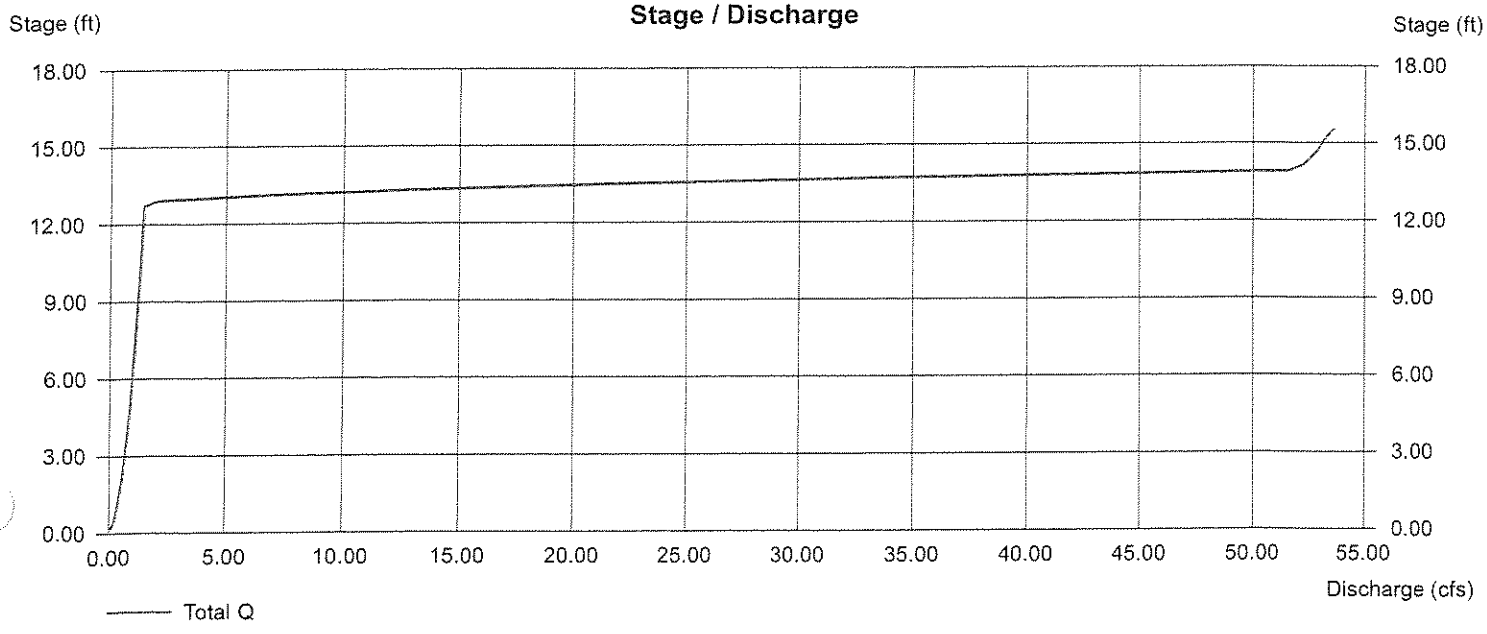
	[A]	[B]	[C]	[D]
Rise (in)	= 24.00	4.00	0.00	0.00
Span (in)	= 24.00	4.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 434.50	434.50	0.00	0.00
Length (ft)	= 110.00	0.00	0.00	0.00
Slope (%)	= 13.00	0.00	0.00	0.00
N-Value	= .024	.013	.013	.013
Orif. Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	Yes

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	30.00	0.00	0.00
Crest El. (ft)	= 447.34	448.13	0.00	0.00
Weir Coeff.	= 3.33	3.33	0.00	0.00
Weir Type	= Riser	Ciplti	---	---
Multi-Stage	= Yes	Yes	No	No

Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control. Weir riser checked for orifice conditions.



Hydrograph Summary Report

Hyd.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	47.77	2	720	109,452	----	------	------	Basin 1 Subarea 2
2	SCS Runoff	6.84	2	718	13,680	----	------	------	Basin 1 Subarea 1
3	SCS Runoff	7.73	2	716	17,441	----	------	------	Basin 1 Subarea 3
4	Combine	61.98	2	718	140,572	1, 2, 3	------	------	Combined Discharge to Pro. Basin 1
5	Reservoir	1.02	2	1132	140,348	4	440.80	99,169	B1DA to Mod Basin 1

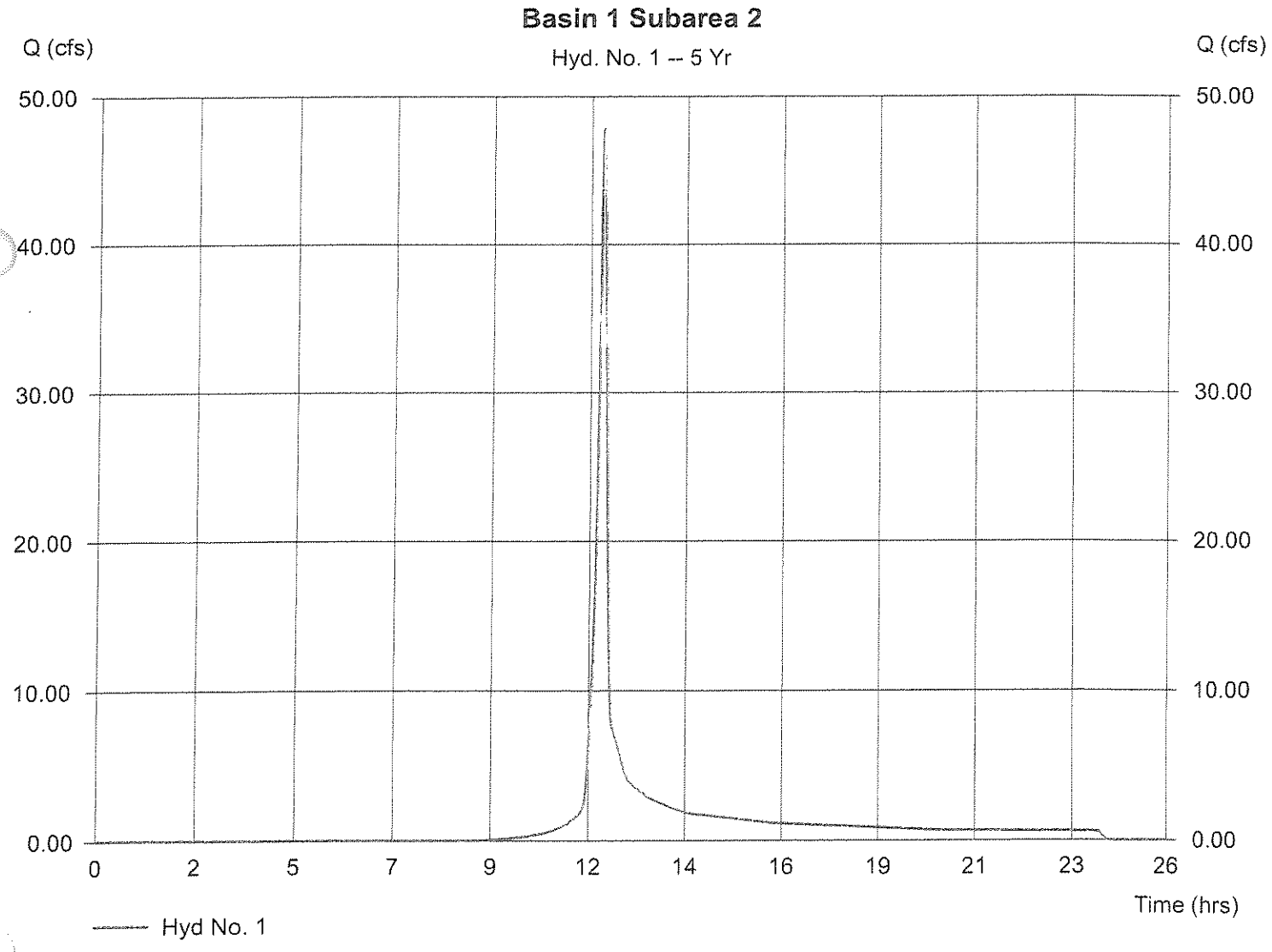
Hydrograph Plot

Hyd. No. 1

Basin 1 Subarea 2

Hydrograph type	= SCS Runoff	Peak discharge	= 47.77 cfs
Storm frequency	= 5 yrs	Time interval	= 2 min
Drainage area	= 18.340 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 9.40 min
Total precip.	= 3.60 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 109,452 cuft



TR55 Tc Worksheet

Hyd. No. 1

Basin 1 Subarea 2

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.130		0.011		0.011		
Flow length (ft)	= 120.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.00		0.00		0.00		
Land slope (%)	= 33.00		0.00		0.00		
Travel Time (min)	**= 3.40**	**+**	**0.00**	**+**	**0.00**	**=**	**3.40**
Shallow Concentrated Flow							
Flow length (ft)	= 786.00		0.00		0.00		
Watercourse slope (%)	= 3.00		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	= 2.79		0.00		0.00		
Travel Time (min)	**= 4.69**	**+**	**0.00**	**+**	**0.00**	**=**	**4.69**
Channel Flow							
X sectional flow area (sqft)	= 4.50		3.53		0.00		
Wetted perimeter (ft)	= 6.50		4.71		0.00		
Channel slope (%)	= 33.00		33.00		0.00		
Manning's n-value	= 0.070		0.010		0.015		
Velocity (ft/s)	= 9.56		70.56		0.00		
Flow length (ft)	= 686.0		372.0		0.0		
Travel Time (min)	**= 1.20**	**+**	**0.09**	**+**	**0.00**	**=**	**1.28**

Total Travel Time, Tc ..... 9.40 min

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

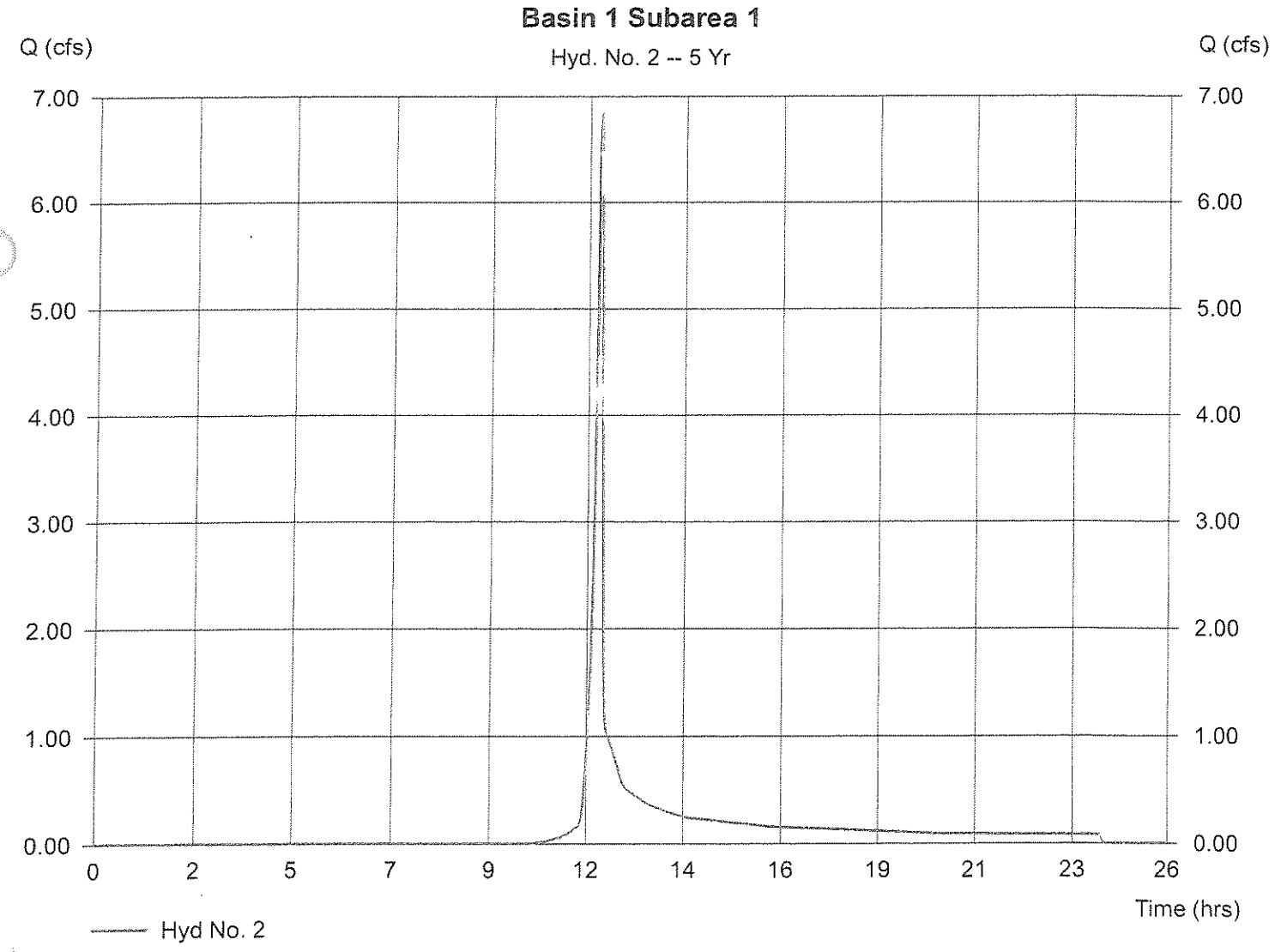
Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 2

Basin 1 Subarea 1

Hydrograph type	= SCS Runoff	Peak discharge	= 6.84 cfs
Storm frequency	= 5 yrs	Time interval	= 2 min
Drainage area	= 3.070 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.60 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 13,680 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

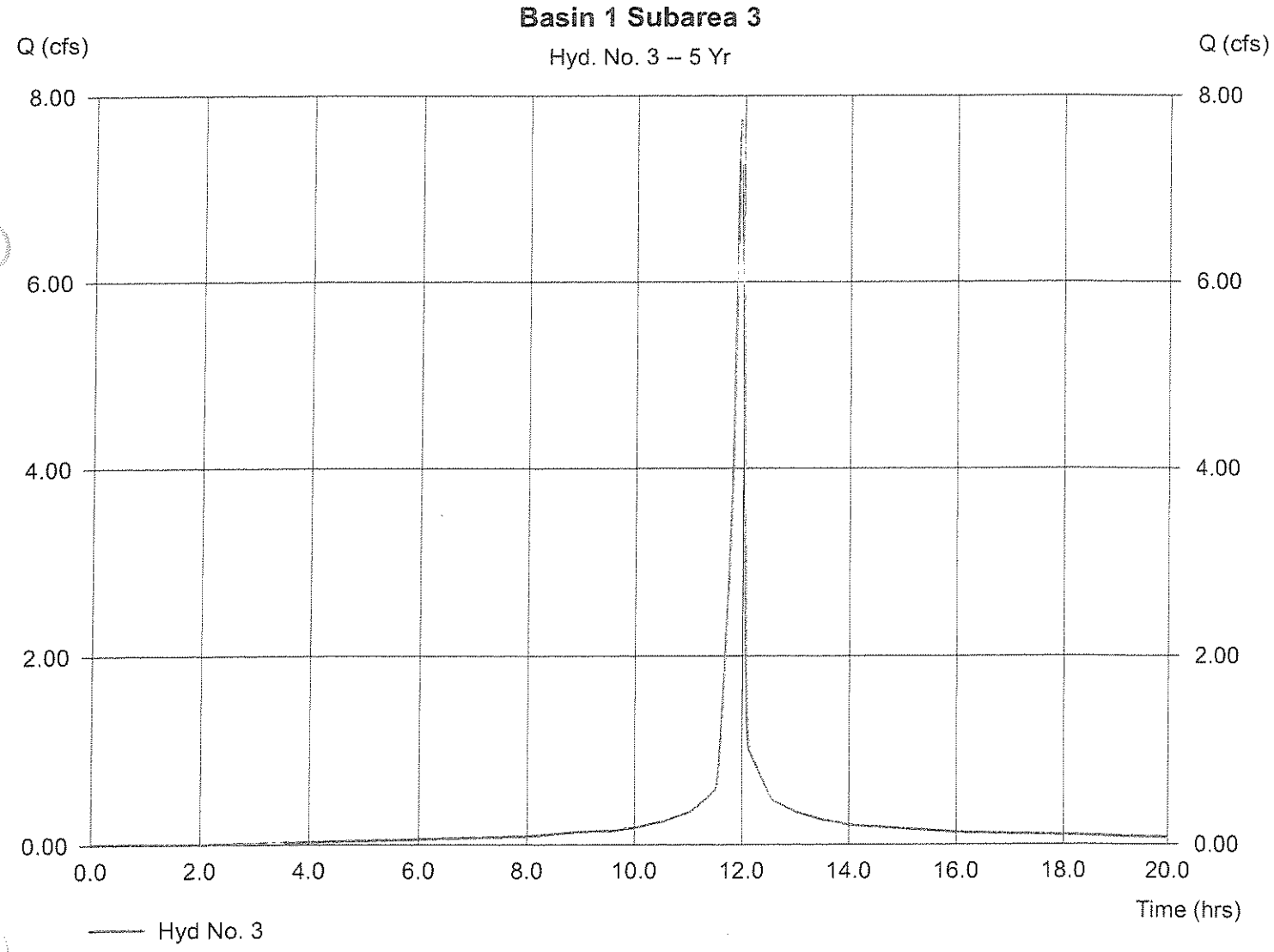
Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 3

Basin 1 Subarea 3

Hydrograph type	= SCS Runoff	Peak discharge	= 7.73 cfs
Storm frequency	= 5 yrs	Time interval	= 2 min
Drainage area	= 1.630 ac	Curve number	= 96
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.60 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 17,441 cuft



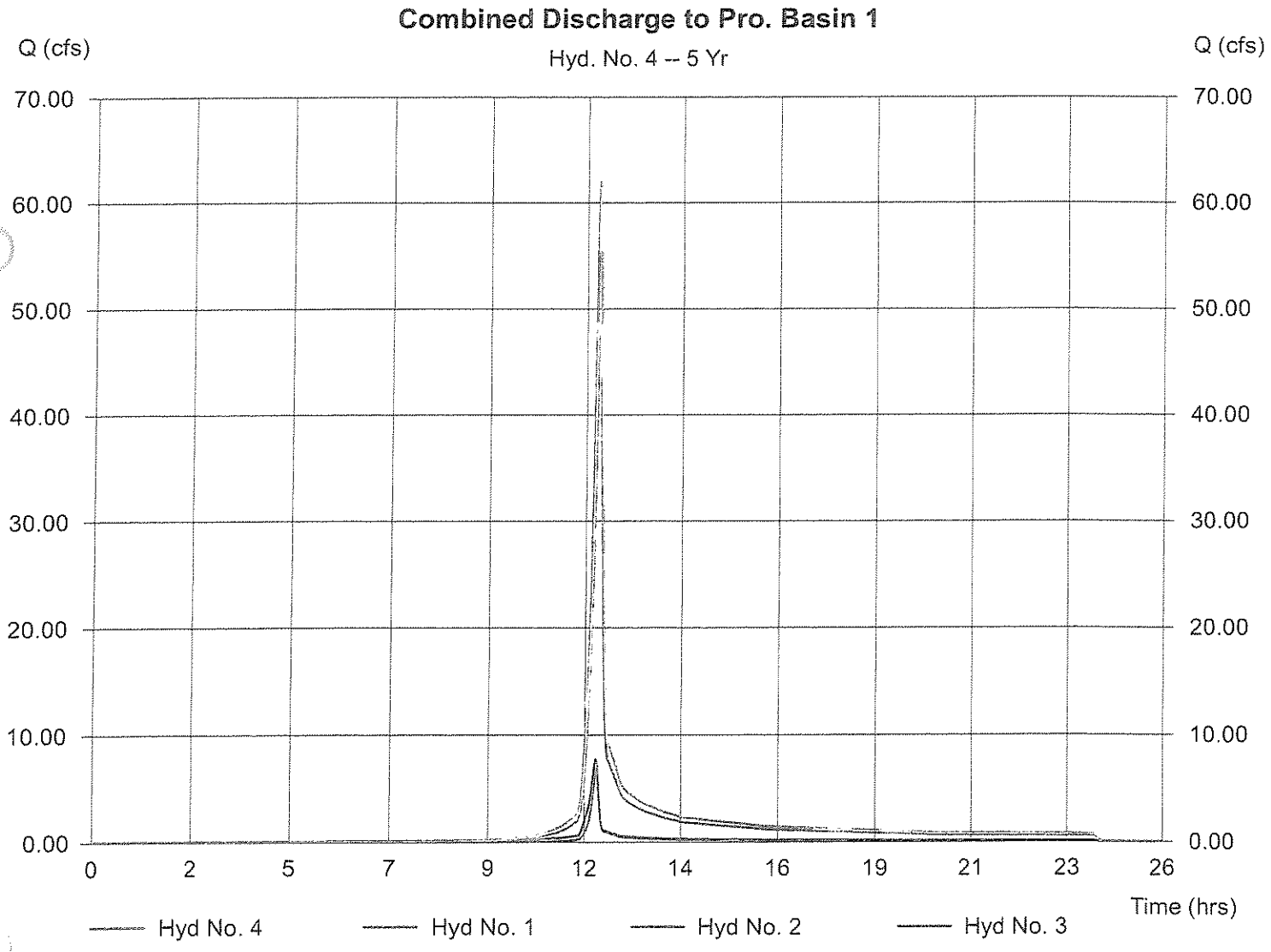
Hydrograph Plot

Hyd. No. 4

Combined Discharge to Pro. Basin 1

Hydrograph type	= Combine	Peak discharge	= 61.98 cfs
Storm frequency	= 5 yrs	Time interval	= 2 min
Inflow hyds.	= 1, 2, 3		

Hydrograph Volume = 140,572 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Wednesday, Sep 4 2019, 6:47 PM

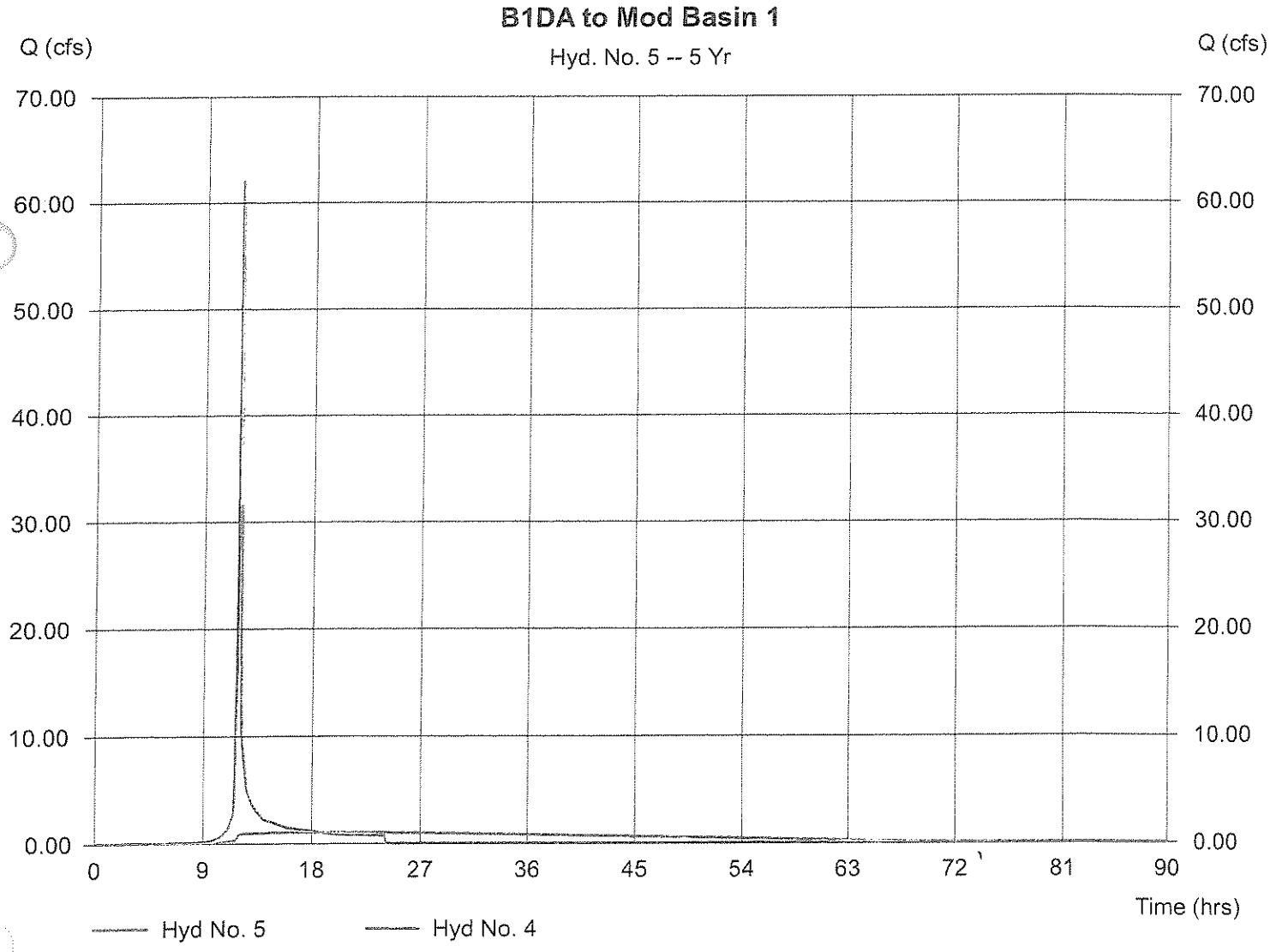
Hyd. No. 5

B1DA to Mod Basin 1

Hydrograph type	= Reservoir	Peak discharge	= 1.02 cfs
Storm frequency	= 5 yrs	Time interval	= 2 min
Inflow hyd. No.	= 4	Max. Elevation	= 440.80 ft
Reservoir name	= Pro. SW Basin 1 wPond	Max. Storage	= 99,169 cuft

Storage Indication method used.

Hydrograph Volume = 140,348 cuft



Pond Report

Hydraflow Hydrographs by Intelisolve — Wednesday, Sep 4 2019, 6:47 PM

Pond No. 1 - Pro. SW Basin 1 wPond

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	434.50	12,000	0	0
1.50	436.00	13,571	19,178	19,178
3.50	438.00	15,671	29,242	48,420
5.50	440.00	18,793	34,464	82,884
7.50	442.00	22,056	40,849	123,733
9.50	444.00	25,164	47,220	170,953
11.50	446.00	28,700	53,864	224,817
13.50	448.00	32,338	61,038	285,855
15.50	450.00	38,138	70,476	356,331

Culvert / Orifice Structures

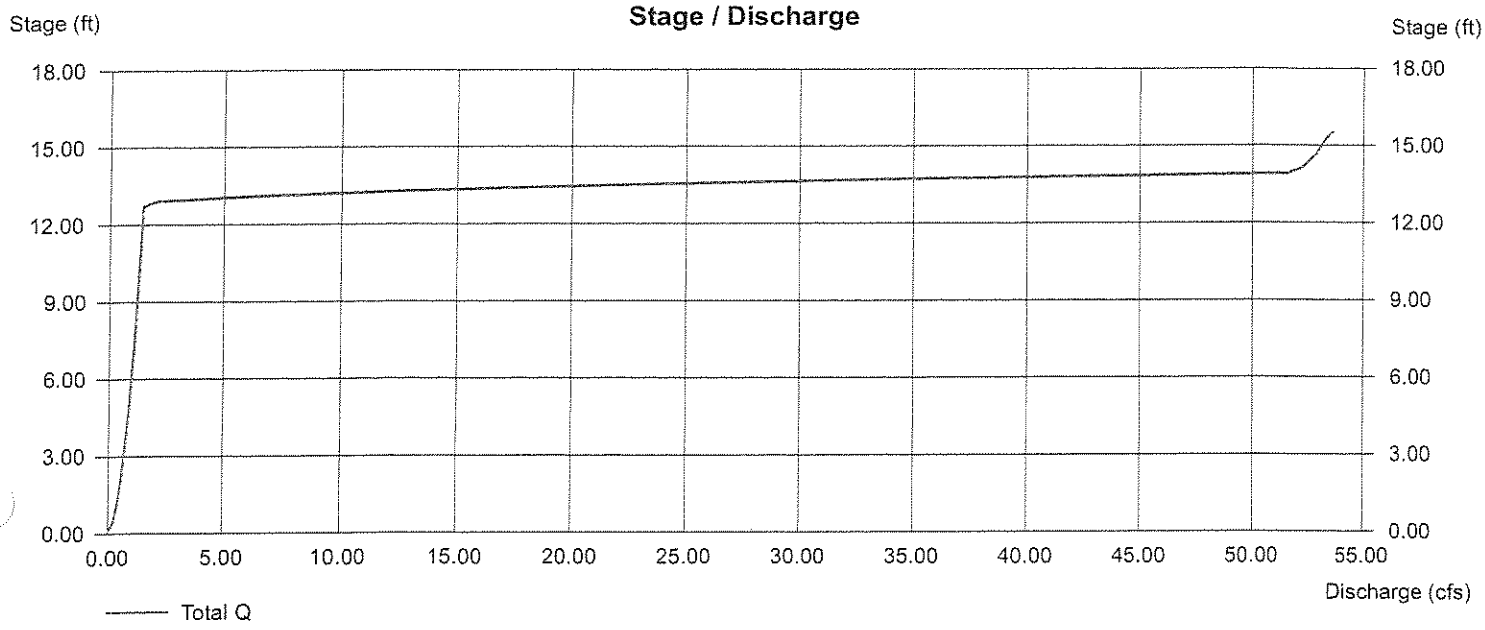
	[A]	[B]	[C]	[D]
Rise (in)	= 24.00	4.00	0.00	0.00
Span (in)	= 24.00	4.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 434.50	434.50	0.00	0.00
Length (ft)	= 110.00	0.00	0.00	0.00
Slope (%)	= 13.00	0.00	0.00	0.00
N-Value	= .024	.013	.013	.013
Orif. Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	Yes

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	30.00	0.00	0.00
Crest El. (ft)	= 447.34	448.13	0.00	0.00
Weir Coeff.	= 3.33	3.33	0.00	0.00
Weir Type	= Riser	Ciplti	---	---
Multi-Stage	= Yes	Yes	No	No

Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control. Weir riser checked for orifice conditions.



Hydrograph Summary Report

Hyd.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	70.58	2	718	161,569	----	------	------	Basin 1 Subarea 2
2	SCS Runoff	10.49	2	718	21,090	----	------	------	Basin 1 Subarea 1
3	SCS Runoff	9.92	2	716	22,718	----	------	------	Basin 1 Subarea 3
4	Combine	90.54	2	718	205,376	1, 2, 3	------	------	Combined Discharge to Pro. Basin 1
5	Reservoir	1.21	2	1184	204,593	4	443.24	153,007	B1DA to Mod Basin 1

Hydrograph Plot

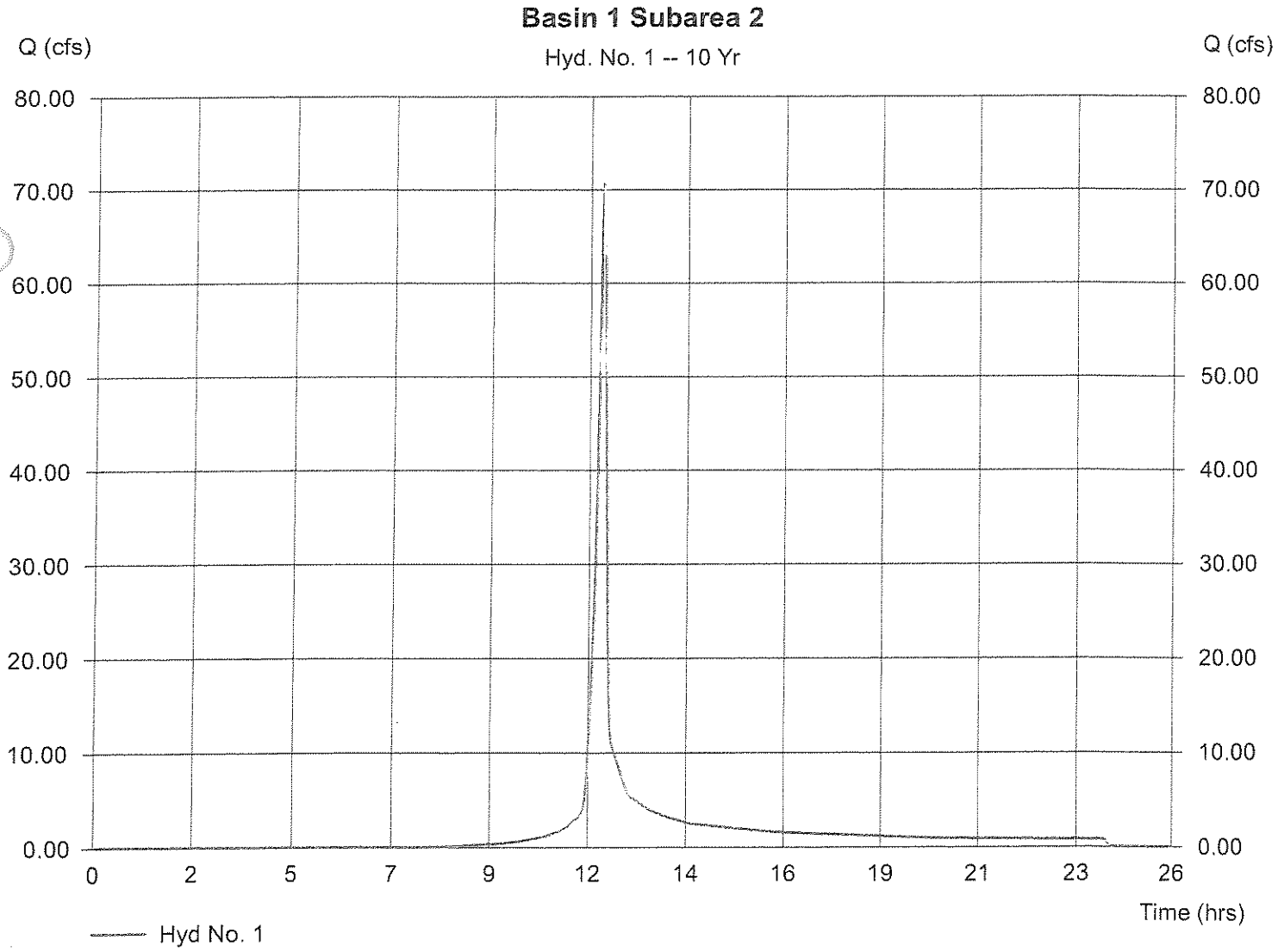
Hydraflow Hydrographs by Intelisolve | Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 1

Basin 1 Subarea 2

Hydrograph type	= SCS Runoff	Peak discharge	= 70.58 cfs
Storm frequency	= 10 yrs	Time interval	= 2 min
Drainage area	= 18.340 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 9.40 min
Total precip.	= 4.56 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 161,569 cuft



TR55 Tc Worksheet

Hyd. No. 1

Basin 1 Subarea 2

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.130	0.011	0.011	
Flow length (ft)	= 120.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.00	0.00	0.00	
Land slope (%)	= 33.00	0.00	0.00	
Travel Time (min)	**= 3.40**	**+ 0.00**	**+ 0.00**	**= 3.40**
Shallow Concentrated Flow				
Flow length (ft)	= 786.00	0.00	0.00	
Watercourse slope (%)	= 3.00	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	= 2.79	0.00	0.00	
Travel Time (min)	**= 4.69**	**+ 0.00**	**+ 0.00**	**= 4.69**
Channel Flow				
X sectional flow area (sqft)	= 4.50	3.53	0.00	
Wetted perimeter (ft)	= 6.50	4.71	0.00	
Channel slope (%)	= 33.00	33.00	0.00	
Manning's n-value	= 0.070	0.010	0.015	
Velocity (ft/s)	= 9.56	70.56	0.00	
Flow length (ft)	= 686.0	372.0	0.0	
Travel Time (min)	**= 1.20**	**+ 0.09**	**+ 0.00**	**= 1.28**

Total Travel Time, Tc ..... 9.40 min

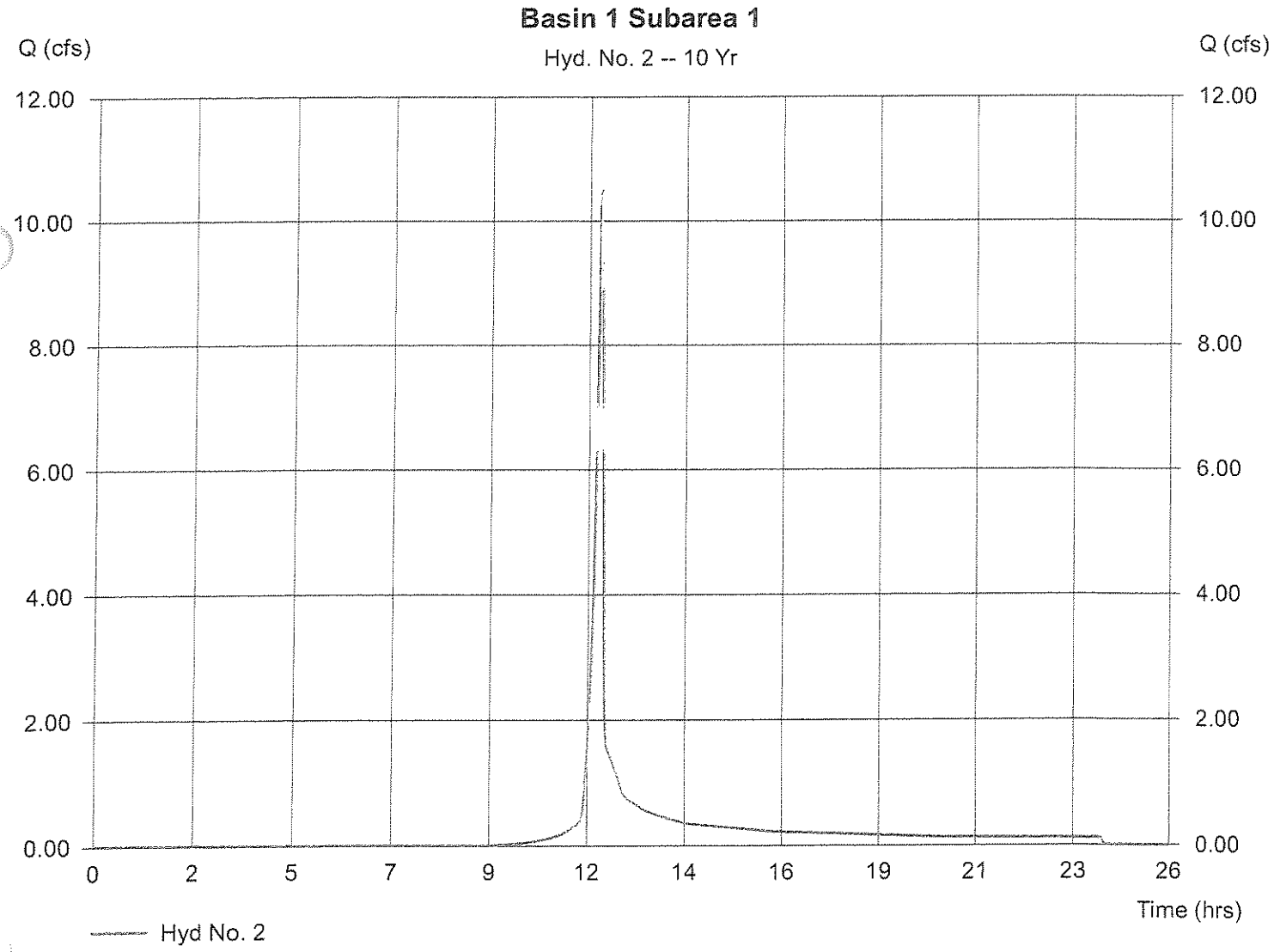
Hydrograph Plot

Hyd. No. 2

Basin 1 Subarea 1

Hydrograph type	= SCS Runoff	Peak discharge	= 10.49 cfs
Storm frequency	= 10 yrs	Time interval	= 2 min
Drainage area	= 3.070 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 4.56 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 21,090 cuft



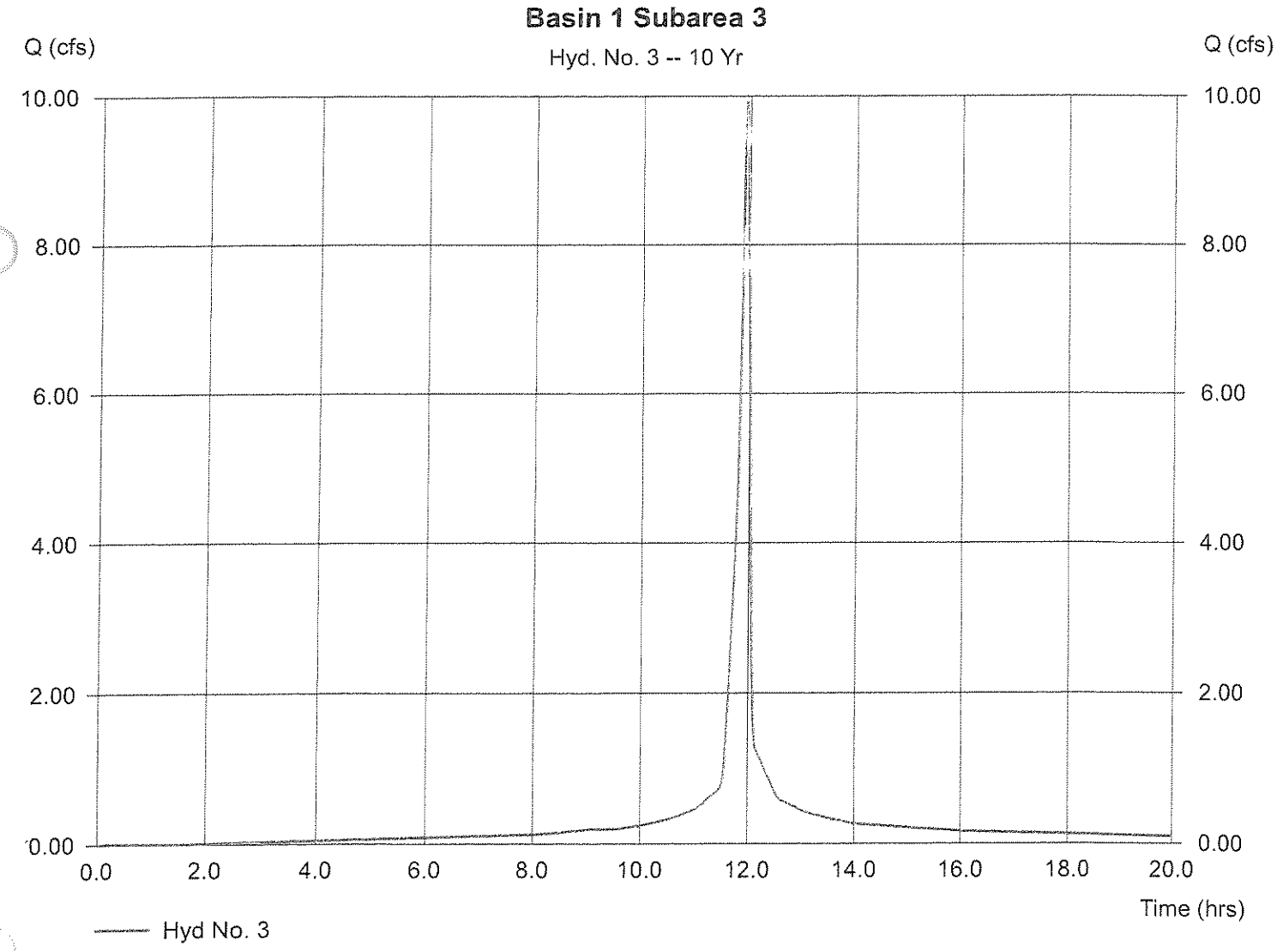
Hydrograph Plot

Hyd. No. 3

Basin 1 Subarea 3

Hydrograph type	= SCS Runoff	Peak discharge	= 9.92 cfs
Storm frequency	= 10 yrs	Time interval	= 2 min
Drainage area	= 1.630 ac	Curve number	= 96
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 4.56 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 22,718 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

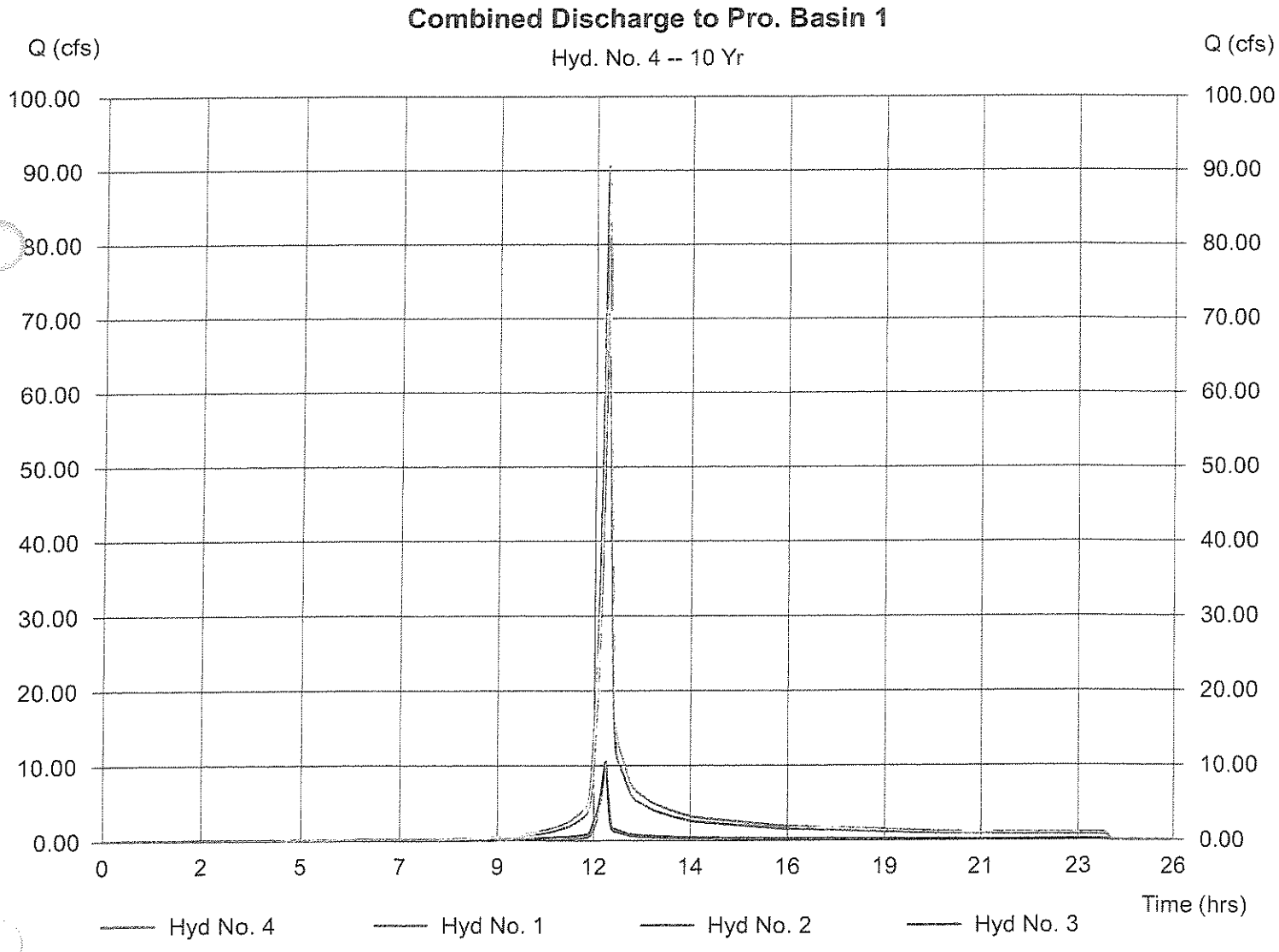
Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 4

Combined Discharge to Pro. Basin 1

Hydrograph type	= Combine	Peak discharge	= 90.54 cfs
Storm frequency	= 10 yrs	Time interval	= 2 min
Inflow hyds.	= 1, 2, 3		

Hydrograph Volume = 205,376 cuft



Hydrograph Plot

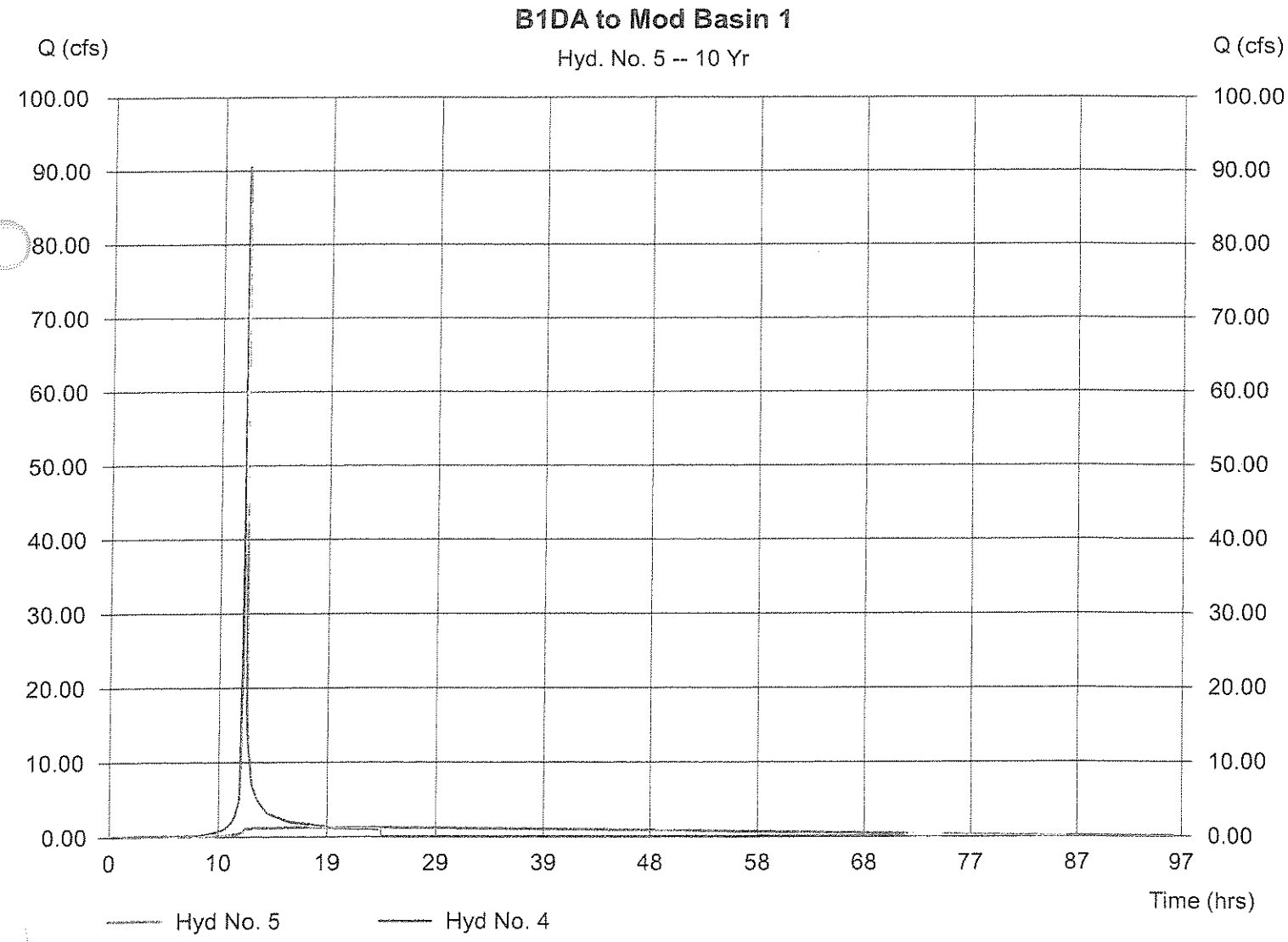
Hydraflow Hydrographs by Intelisolve | Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 5

B1DA to Mod Basin 1

Hydrograph type	= Reservoir	Peak discharge	= 1.21 cfs
Storm frequency	= 10 yrs	Time interval	= 2 min
Inflow hyd. No.	= 4	Max. Elevation	= 443.24 ft
Reservoir name	= Pro. SW Basin 1 wPond	Max. Storage	= 153,007 cuft

Storage Indication method used. | Hydrograph Volume = 204,593 cuft



Pond Report

Hydraflow Hydrographs by Intelisolve — Wednesday, Sep 4 2019, 6:47 PM

Pond No. 1 - Pro. SW Basin 1 wPond

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	434.50	12,000	0	0
1.50	436.00	13,571	19,178	19,178
3.50	438.00	15,671	29,242	48,420
5.50	440.00	18,793	34,464	82,884
7.50	442.00	22,056	40,849	123,733
9.50	444.00	25,164	47,220	170,953
11.50	446.00	28,700	53,864	224,817
13.50	448.00	32,338	61,038	285,855
15.50	450.00	38,138	70,476	356,331

Culvert / Orifice Structures

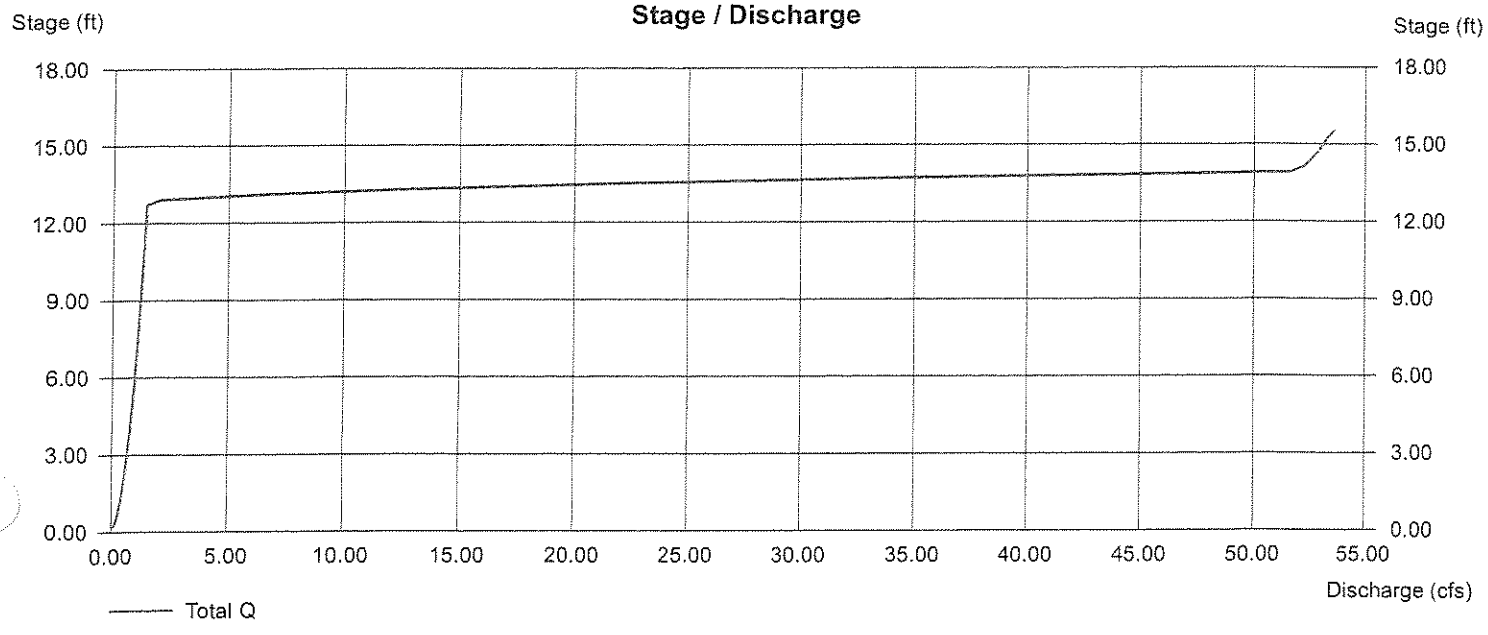
	[A]	[B]	[C]	[D]
Rise (in)	= 24.00	4.00	0.00	0.00
Span (in)	= 24.00	4.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 434.50	434.50	0.00	0.00
Length (ft)	= 110.00	0.00	0.00	0.00
Slope (%)	= 13.00	0.00	0.00	0.00
N-Value	= .024	.013	.013	.013
Orif. Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	Yes

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	30.00	0.00	0.00
Crest El. (ft)	= 447.34	448.13	0.00	0.00
Weir Coeff.	= 3.33	3.33	0.00	0.00
Weir Type	= Riser	Ciplti	---	---
Multi-Stage	= Yes	Yes	No	No

Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control. Weir riser checked for orifice conditions.



Hydrograph Summary Report

Hyd.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	94.21	2	718	216,647	----	------	------	Basin 1 Subarea 2
2	SCS Runoff	14.40	2	716	29,103	----	------	------	Basin 1 Subarea 1
3	SCS Runoff	12.09	2	716	28,011	----	------	------	Basin 1 Subarea 3
4	Combine	120.09	2	718	273,761	1, 2, 3	------	------	Combined Discharge to Pro. Basin 1
5	Reservoir	1.36	2	1286	271,105	4	445.52	211,780	B1DA to Mod Basin 1

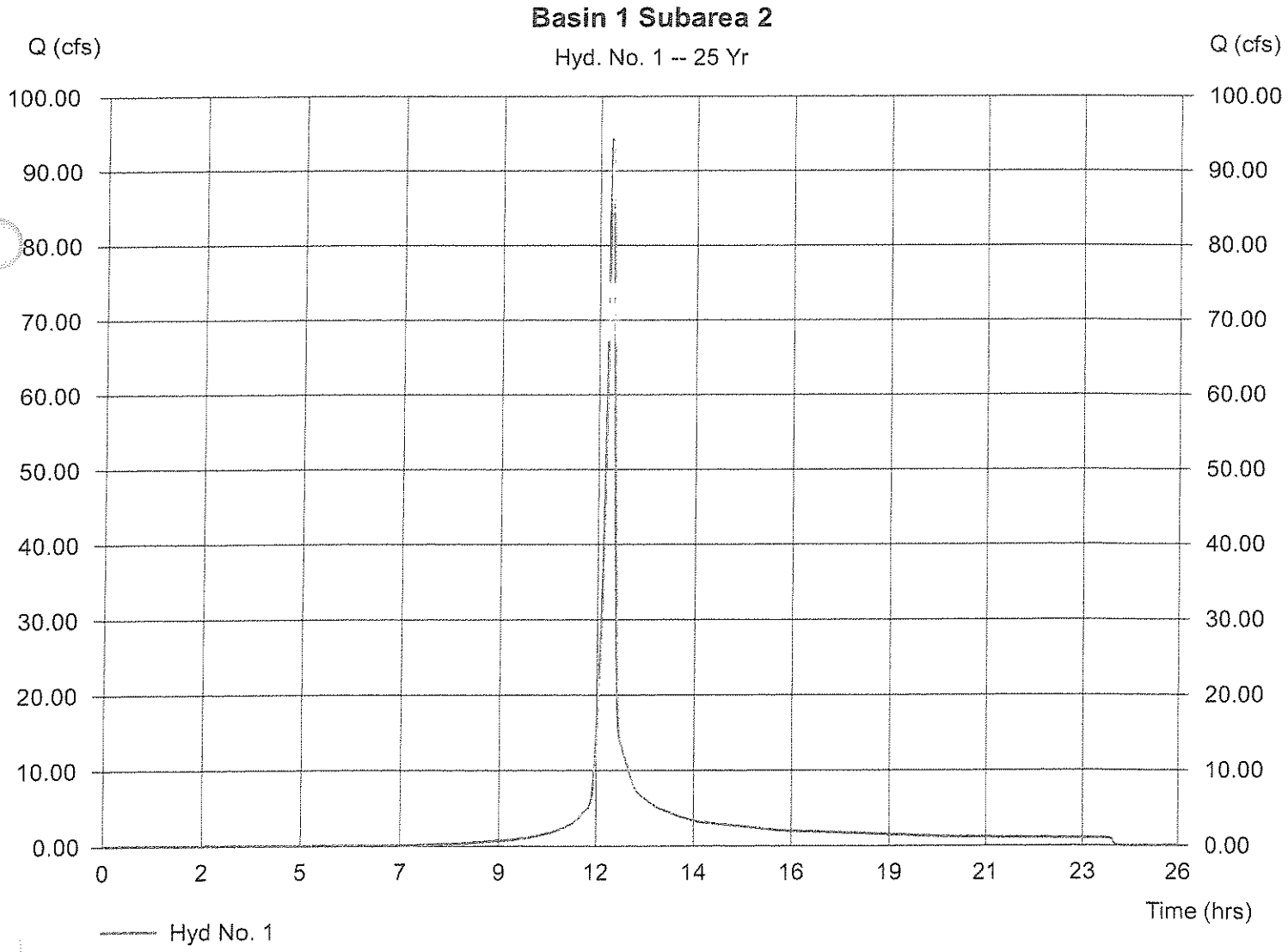
Hydrograph Plot

Hyd. No. 1

Basin 1 Subarea 2

Hydrograph type	= SCS Runoff	Peak discharge	= 94.21 cfs
Storm frequency	= 25 yrs	Time interval	= 2 min
Drainage area	= 18.340 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 9.40 min
Total precip.	= 5.52 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 216,647 cuft



TR55 Tc Worksheet

Hyd. No. 1

Basin 1 Subarea 2

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.130		0.011		0.011		
Flow length (ft)	= 120.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.00		0.00		0.00		
Land slope (%)	= 33.00		0.00		0.00		
Travel Time (min)	**= 3.40**	**+**	**0.00**	**+**	**0.00**	**=**	**3.40**
Shallow Concentrated Flow							
Flow length (ft)	= 786.00		0.00		0.00		
Watercourse slope (%)	= 3.00		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	= 2.79		0.00		0.00		
Travel Time (min)	**= 4.69**	**+**	**0.00**	**+**	**0.00**	**=**	**4.69**
Channel Flow							
X sectional flow area (sqft)	= 4.50		3.53		0.00		
Wetted perimeter (ft)	= 6.50		4.71		0.00		
Channel slope (%)	= 33.00		33.00		0.00		
Manning's n-value	= 0.070		0.010		0.015		
Velocity (ft/s)	= 9.56		70.56		0.00		
Flow length (ft)	= 686.0		372.0		0.0		
Travel Time (min)	**= 1.20**	**+**	**0.09**	**+**	**0.00**	**=**	**1.28**

Total Travel Time, Tc ..... 9.40 min

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

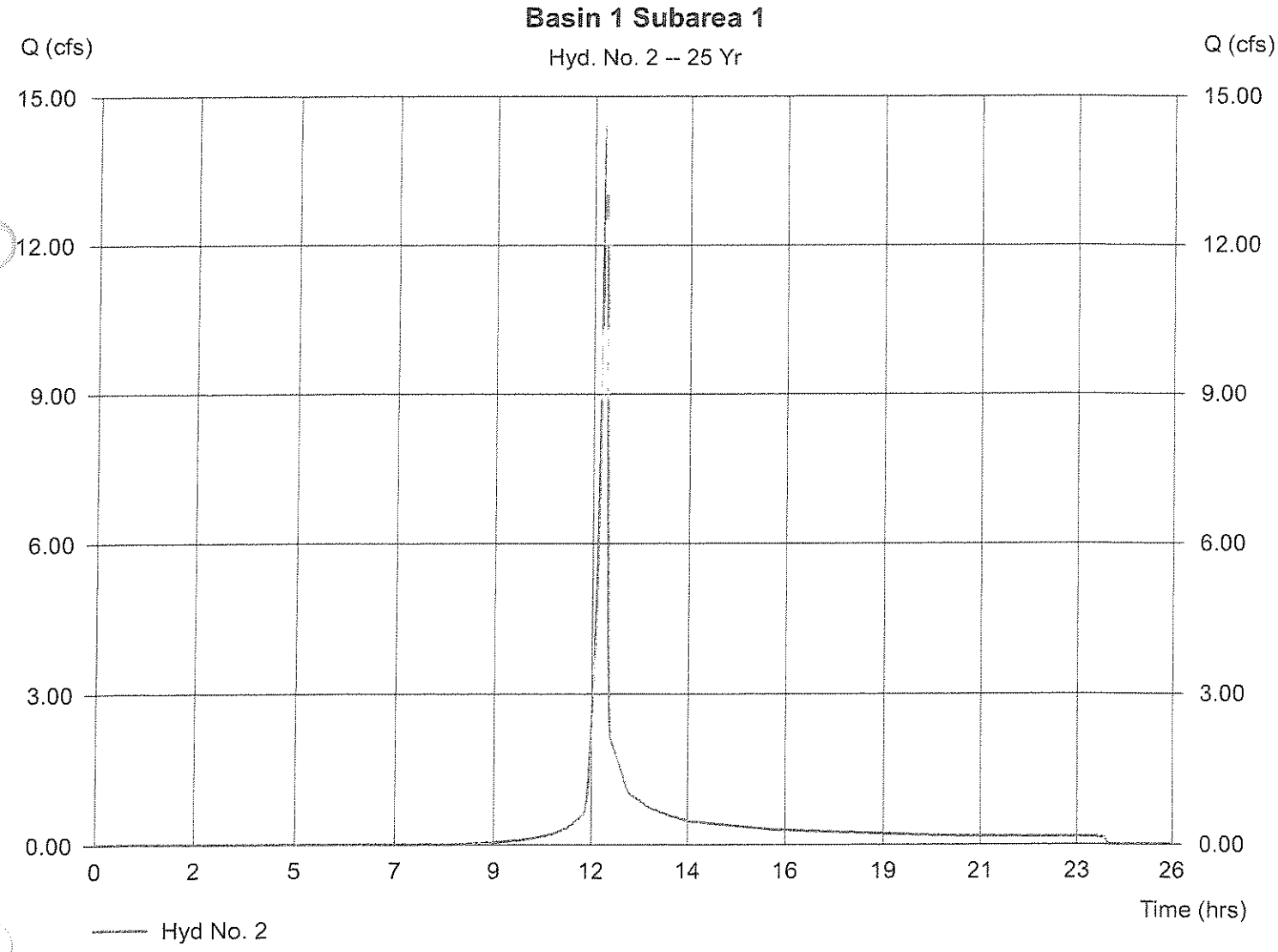
Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 2

Basin 1 Subarea 1

Hydrograph type	= SCS Runoff	Peak discharge	= 14.40 cfs
Storm frequency	= 25 yrs	Time interval	= 2 min
Drainage area	= 3.070 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.52 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 29,103 cuft



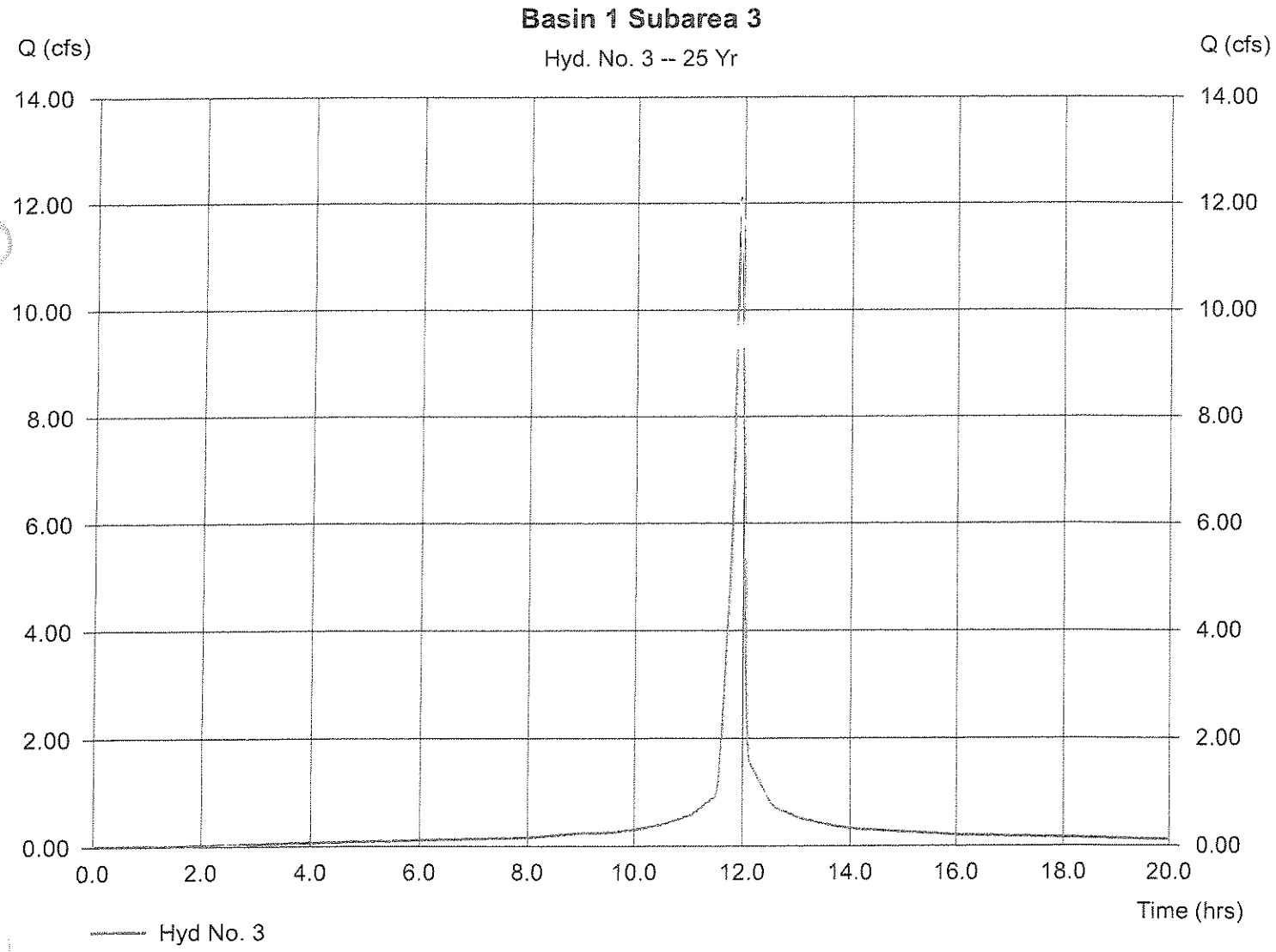
Hydrograph Plot

Hyd. No. 3

Basin 1 Subarea 3

Hydrograph type	= SCS Runoff	Peak discharge	= 12.09 cfs
Storm frequency	= 25 yrs	Time interval	= 2 min
Drainage area	= 1.630 ac	Curve number	= 96
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 5.52 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 28,011 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

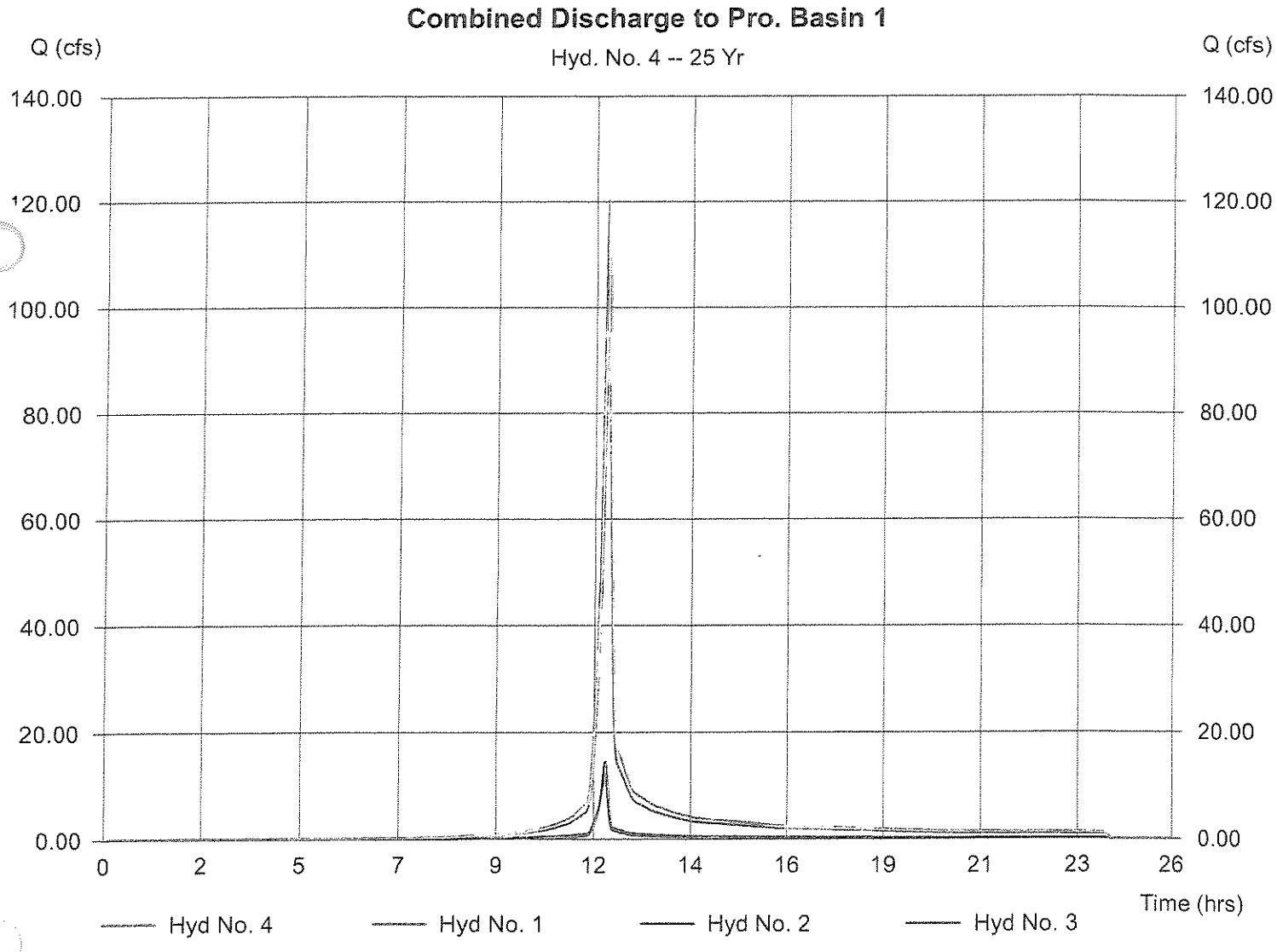
Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 4

Combined Discharge to Pro. Basin 1

Hydrograph type	= Combine	Peak discharge	= 120.09 cfs
Storm frequency	= 25 yrs	Time interval	= 2 min
Inflow hyds.	= 1, 2, 3		

Hydrograph Volume = 273,761 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Wednesday, Sep 4 2019, 6:47 PM

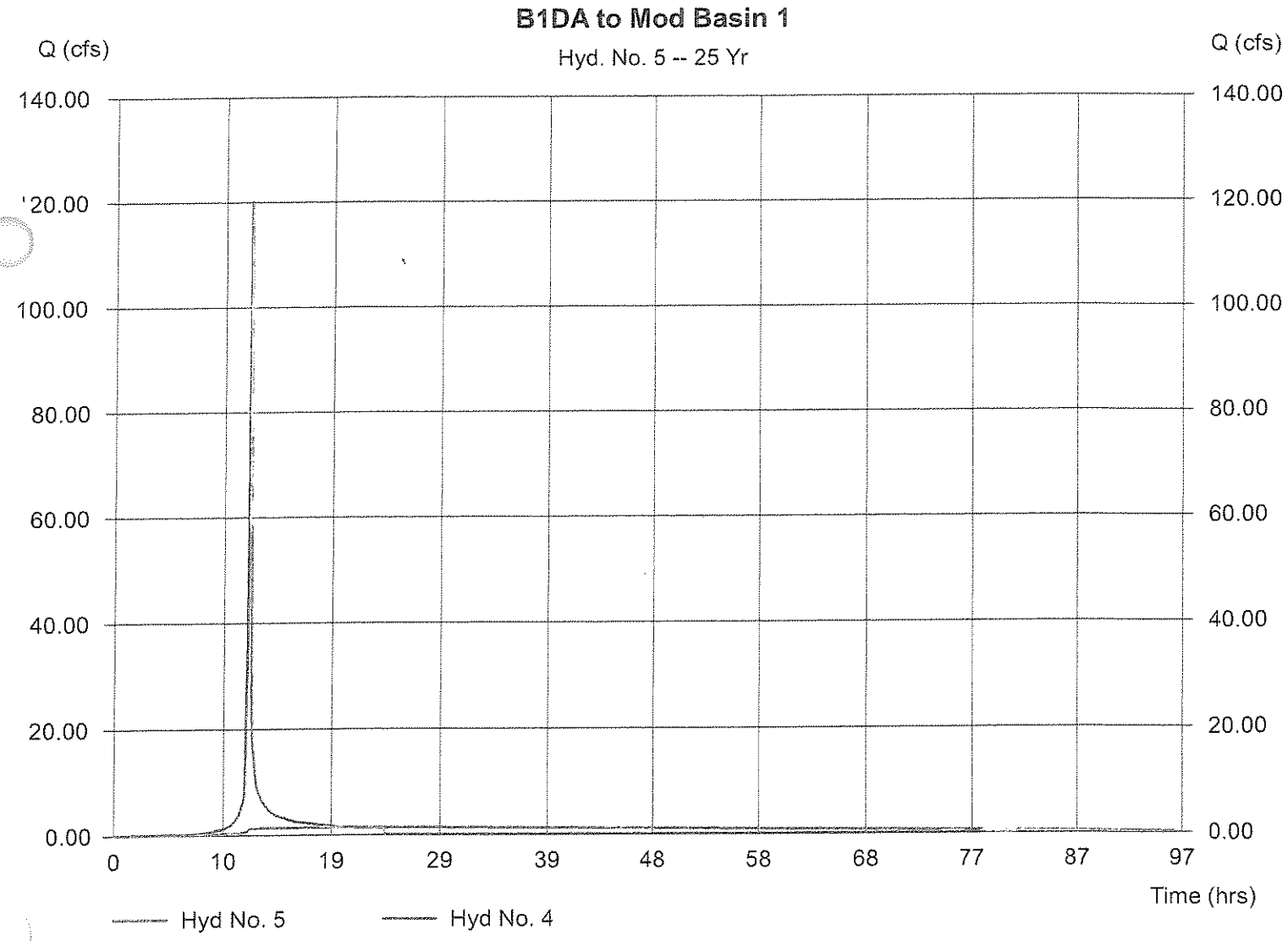
Hyd. No. 5

B1DA to Mod Basin 1

Hydrograph type	= Reservoir	Peak discharge	= 1.36 cfs
Storm frequency	= 25 yrs	Time interval	= 2 min
Inflow hyd. No.	= 4	Max. Elevation	= 445.52 ft
Reservoir name	= Pro. SW Basin 1 wPond	Max. Storage	= 211,780 cuft

Storage Indication method used.

Hydrograph Volume = 271,105 cuft



Pond Report

Hydraflow Hydrographs by Intelisolve — Wednesday, Sep 4 2019, 6:47 PM

Pond No. 1 - Pro. SW Basin 1 wPond

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	434.50	12,000	0	0
1.50	436.00	13,571	19,178	19,178
3.50	438.00	15,671	29,242	48,420
5.50	440.00	18,793	34,464	82,884
7.50	442.00	22,056	40,849	123,733
9.50	444.00	25,164	47,220	170,953
11.50	446.00	28,700	53,864	224,817
13.50	448.00	32,338	61,038	285,855
15.50	450.00	38,138	70,476	356,331

Culvert / Orifice Structures

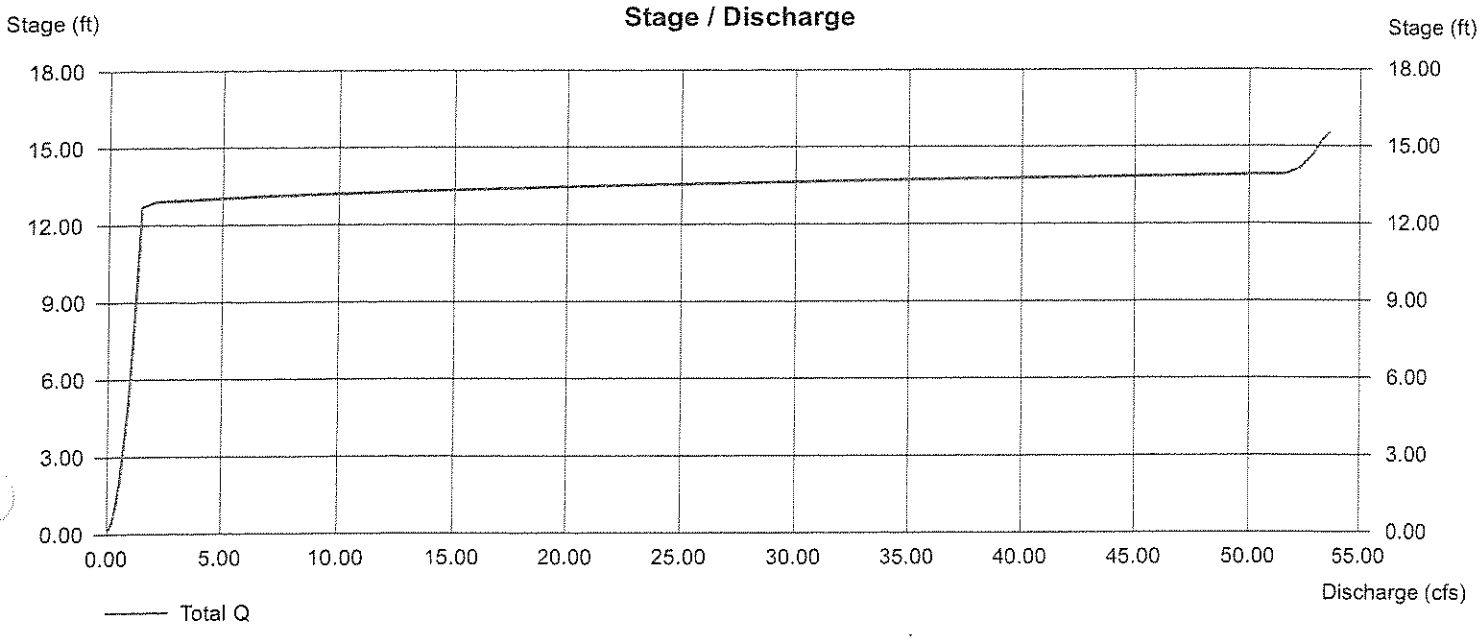
	[A]	[B]	[C]	[D]
Rise (in)	= 24.00	4.00	0.00	0.00
Span (in)	= 24.00	4.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 434.50	434.50	0.00	0.00
Length (ft)	= 110.00	0.00	0.00	0.00
Slope (%)	= 13.00	0.00	0.00	0.00
N-Value	= .024	.013	.013	.013
Orif. Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	Yes

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	30.00	0.00	0.00
Crest El. (ft)	= 447.34	448.13	0.00	0.00
Weir Coeff.	= 3.33	3.33	0.00	0.00
Weir Type	= Riser	Ciplti	---	---
Multi-Stage	= Yes	Yes	No	No

Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control. Weir riser checked for orifice conditions.



Hydrograph Summary Report

Hyd.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	118.25	2	718	273,696	----	------	------	Basin 1 Subarea 2
2	SCS Runoff	18.51	2	716	37,533	----	------	------	Basin 1 Subarea 1
3	SCS Runoff	14.25	2	716	33,313	----	------	------	Basin 1 Subarea 3
4	Combine	150.13	2	718	344,542	1, 2, 3	------	------	Combined Discharge to Pro. Basin 1
5	Reservoir	2.12	2	1134	334,432	4	447.40	267,625	B1DA to Mod Basin 1

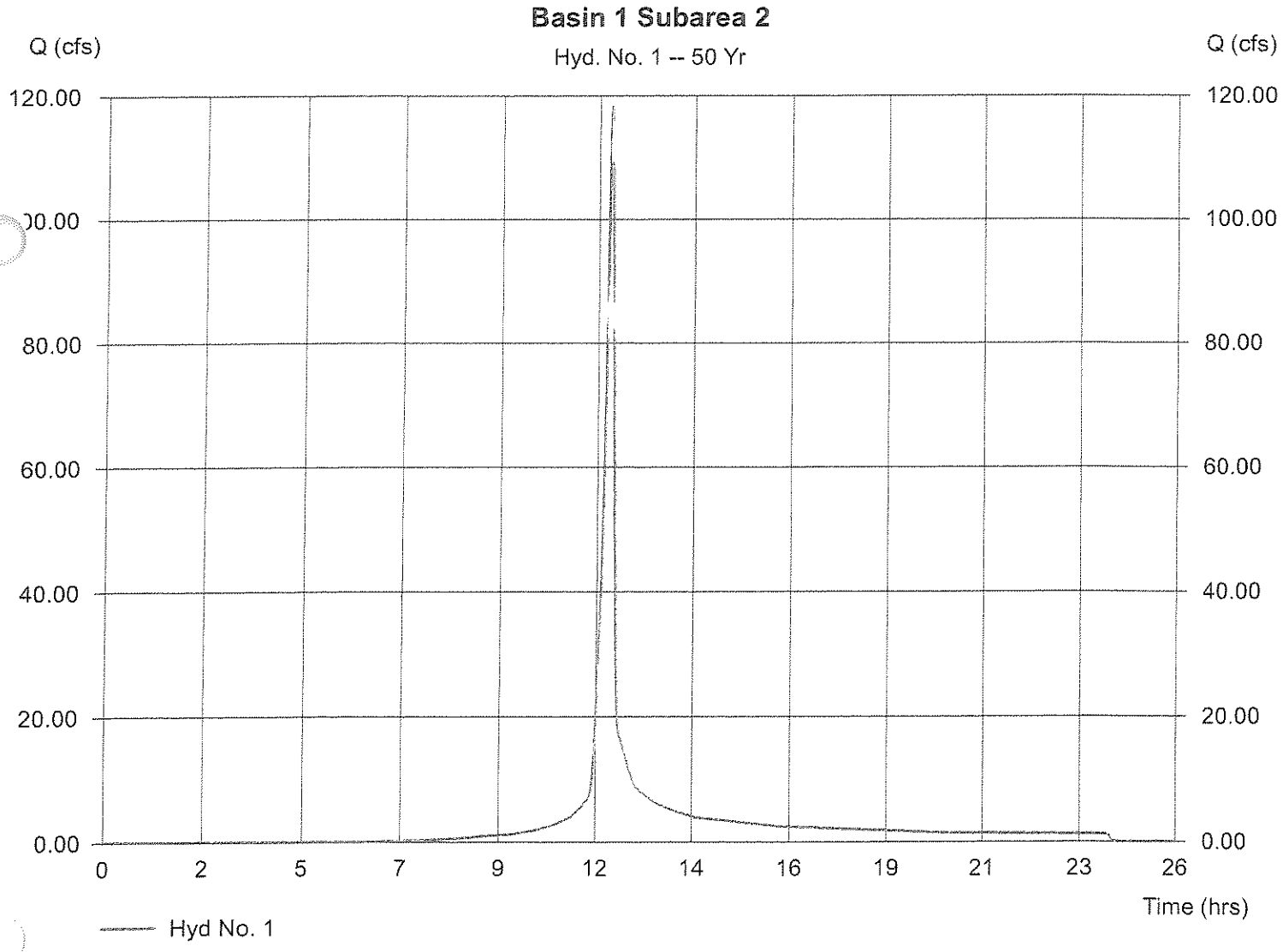
Hydrograph Plot

Hyd. No. 1

Basin 1 Subarea 2

Hydrograph type	= SCS Runoff	Peak discharge	= 118.25 cfs
Storm frequency	= 50 yrs	Time interval	= 2 min
Drainage area	= 18.340 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 9.40 min
Total precip.	= 6.48 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 273,696 cuft



TR55 Tc Worksheet

Hyd. No. 1

Basin 1 Subarea 2

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.130		0.011		0.011		
Flow length (ft)	= 120.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.00		0.00		0.00		
Land slope (%)	= 33.00		0.00		0.00		
Travel Time (min)	**= 3.40**	**+**	**0.00**	**+**	**0.00**	**=**	**3.40**
Shallow Concentrated Flow							
Flow length (ft)	= 786.00		0.00		0.00		
Watercourse slope (%)	= 3.00		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	= 2.79		0.00		0.00		
Travel Time (min)	**= 4.69**	**+**	**0.00**	**+**	**0.00**	**=**	**4.69**
Channel Flow							
X sectional flow area (sqft)	= 4.50		3.53		0.00		
Wetted perimeter (ft)	= 6.50		4.71		0.00		
Channel slope (%)	= 33.00		33.00		0.00		
Manning's n-value	= 0.070		0.010		0.015		
Velocity (ft/s)	= 9.56		70.56		0.00		
Flow length (ft)	= 686.0		372.0		0.0		
Travel Time (min)	**= 1.20**	**+**	**0.09**	**+**	**0.00**	**=**	**1.28**

Total Travel Time, Tc ..... 9.40 min

Hydrograph Plot

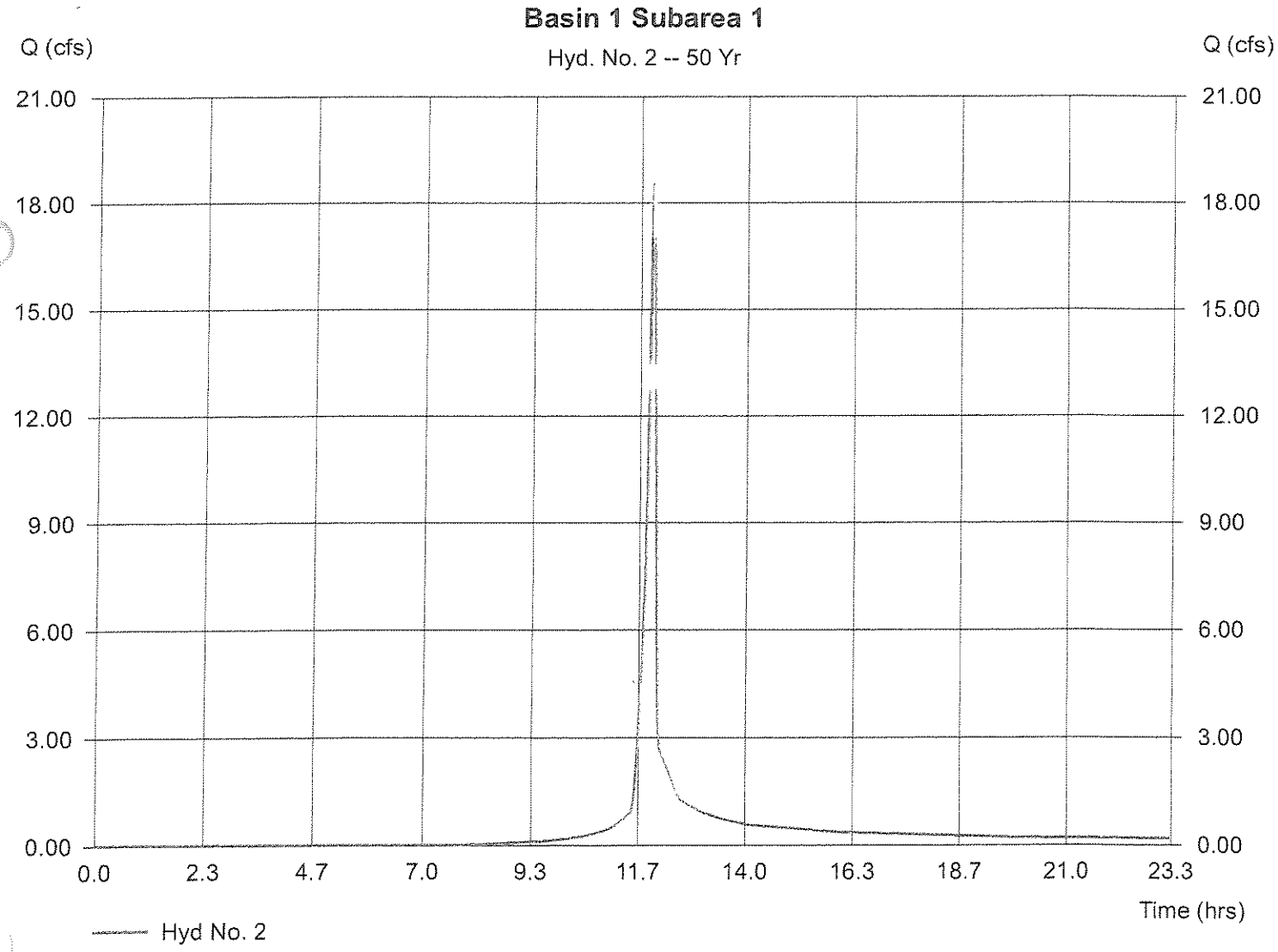
Hydraflow Hydrographs by Intelisolve | Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 2

Basin 1 Subarea 1

Hydrograph type	= SCS Runoff	Peak discharge	= 18.51 cfs
Storm frequency	= 50 yrs	Time interval	= 2 min
Drainage area	= 3.070 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 6.48 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 37,533 cuft



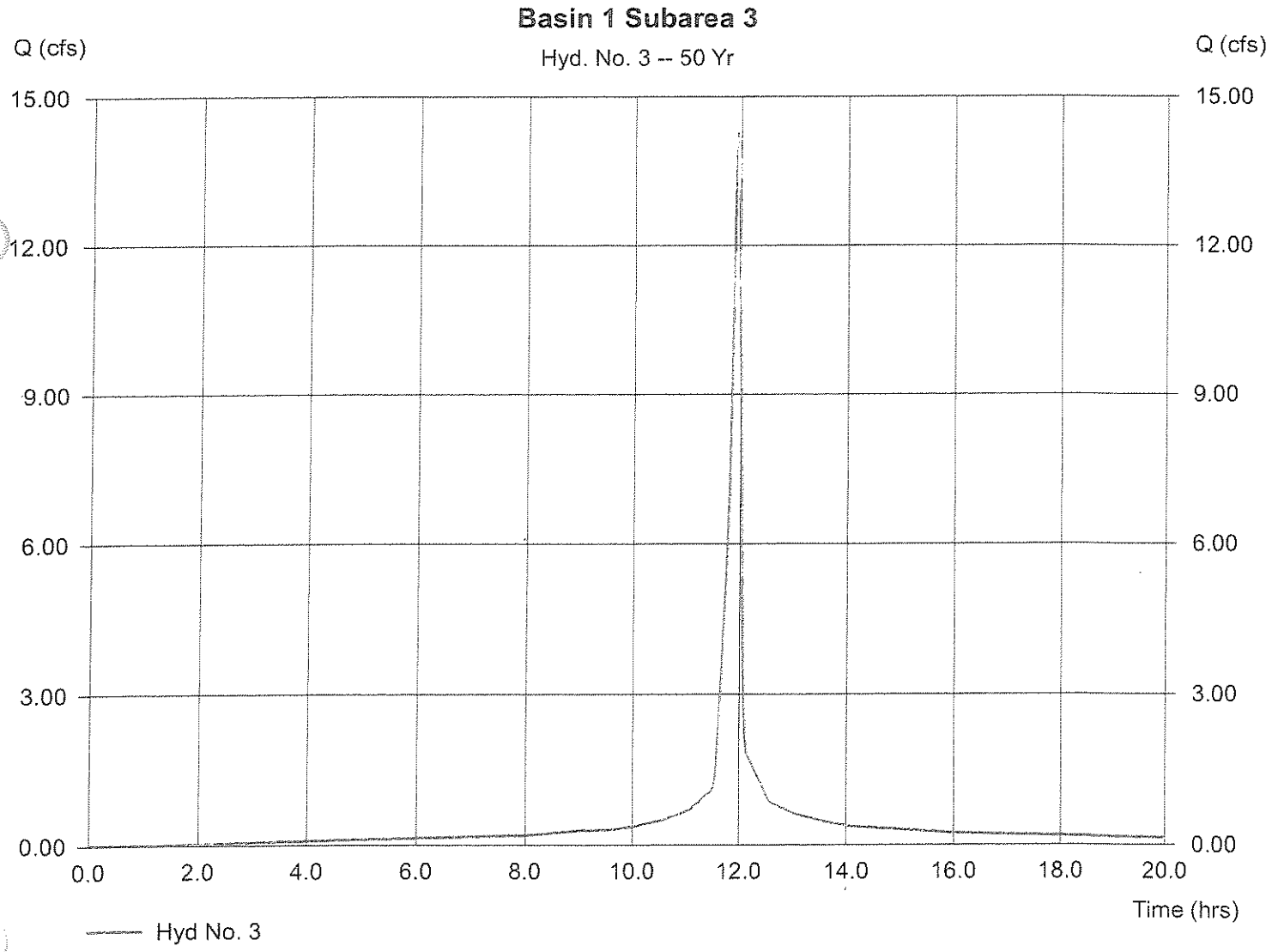
Hydrograph Plot

Hyd. No. 3

Basin 1 Subarea 3

Hydrograph type	= SCS Runoff	Peak discharge	= 14.25 cfs
Storm frequency	= 50 yrs	Time interval	= 2 min
Drainage area	= 1.630 ac	Curve number	= 96
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 6.48 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 33,313 cuft



Hydrograph Plot

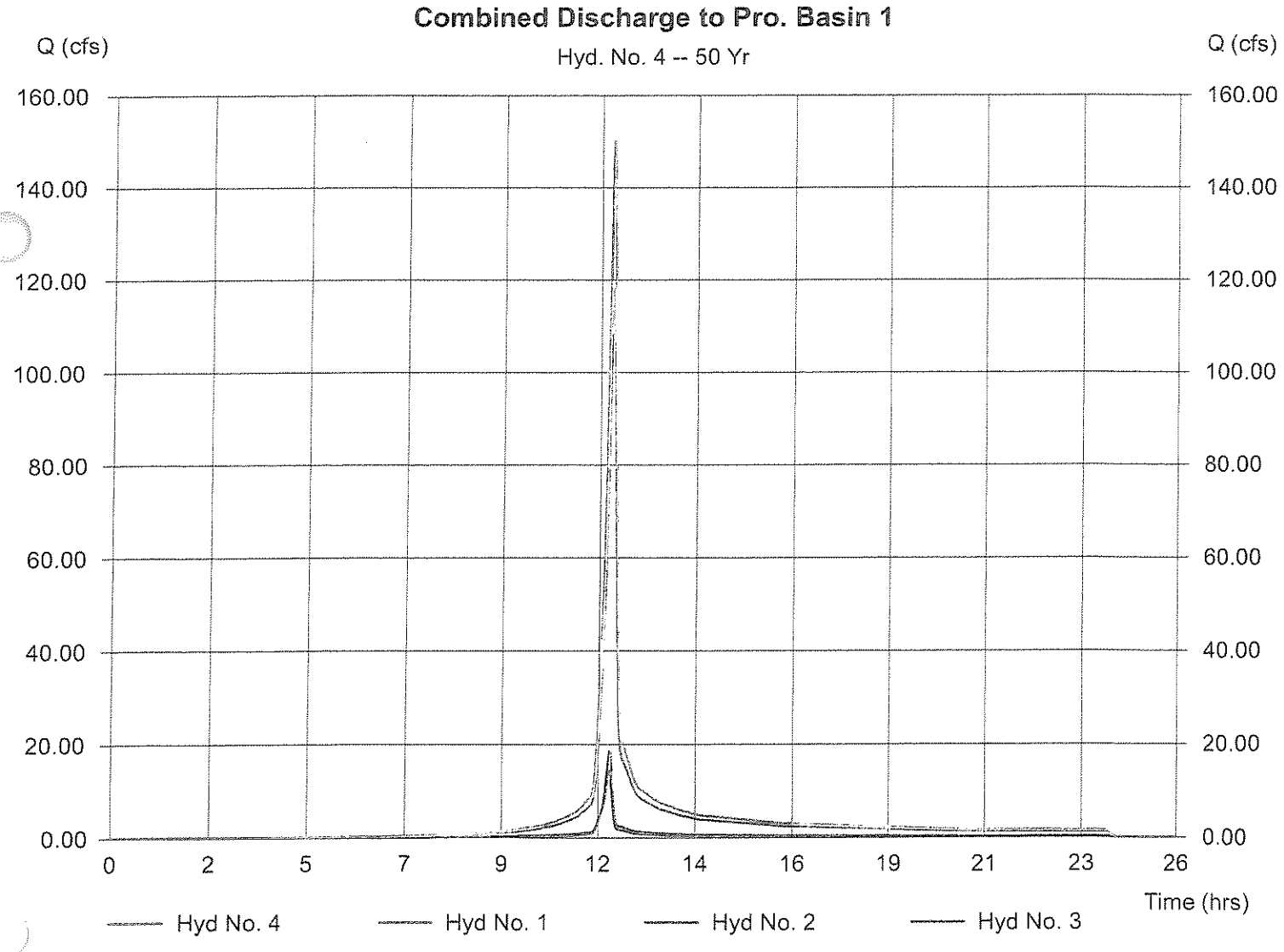
Hydraflow Hydrographs by Intelisolve | Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 4

Combined Discharge to Pro. Basin 1

Hydrograph type	= Combine	Peak discharge	= 150.13 cfs
Storm frequency	= 50 yrs	Time interval	= 2 min
Inflow hyds.	= 1, 2, 3		

Hydrograph Volume = 344,542 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Wednesday, Sep 4 2019, 6:47 PM

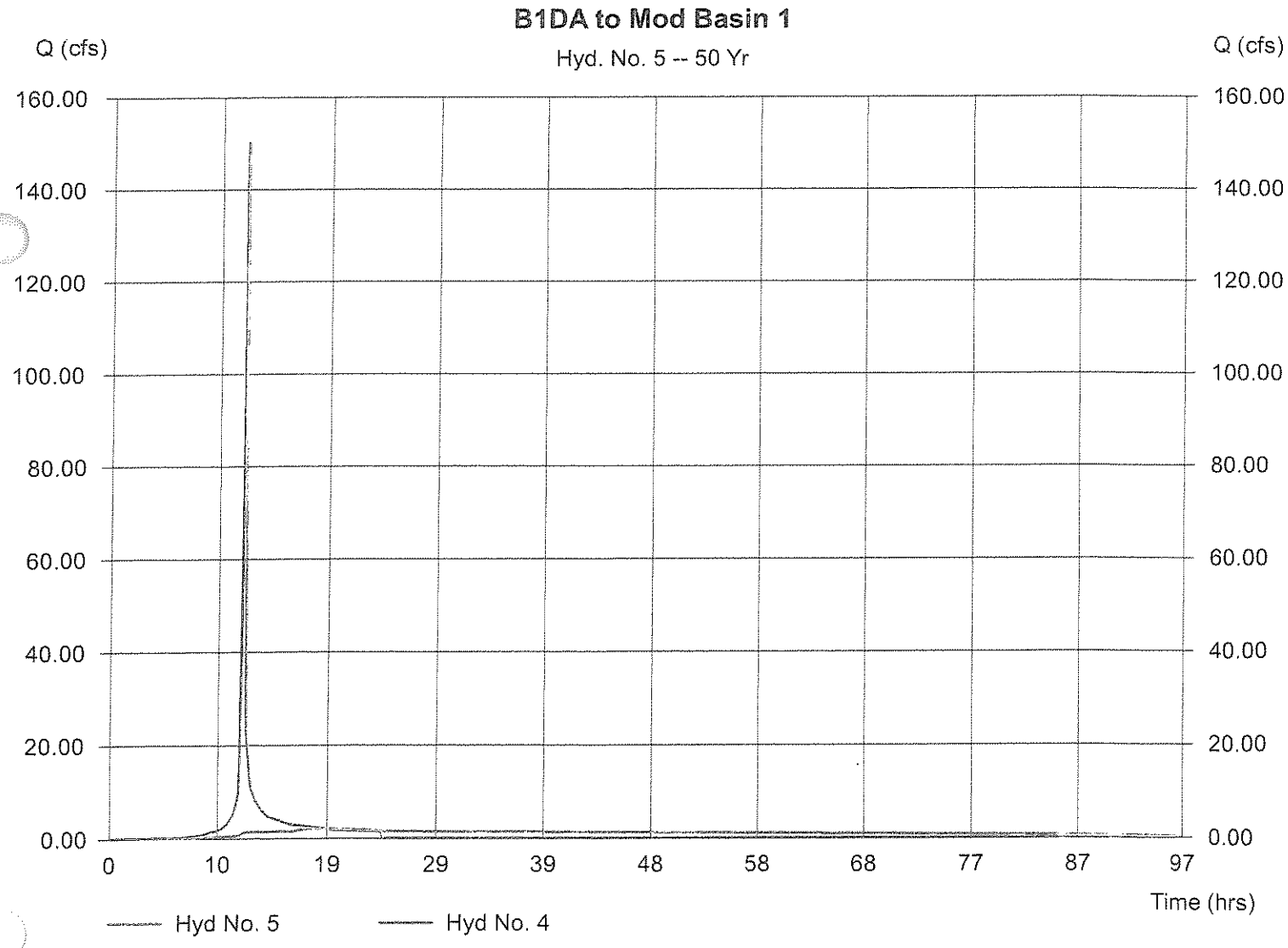
Hyd. No. 5

B1DA to Mod Basin 1

Hydrograph type	= Reservoir	Peak discharge	= 2.12 cfs
Storm frequency	= 50 yrs	Time interval	= 2 min
Inflow hyd. No.	= 4	Max. Elevation	= 447.40 ft
Reservoir name	= Pro. SW Basin 1 wPond	Max. Storage	= 267,625 cuft

Storage Indication method used.

Hydrograph Volume = 334,432 cuft



Pond Report

Hydraflow Hydrographs by Intelisolve — Wednesday, Sep 4 2019, 6:47 PM

Pond No. 1 - Pro. SW Basin 1 wPond

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	434.50	12,000	0	0
1.50	436.00	13,571	19,178	19,178
3.50	438.00	15,671	29,242	48,420
5.50	440.00	18,793	34,464	82,884
7.50	442.00	22,056	40,849	123,733
9.50	444.00	25,164	47,220	170,953
11.50	446.00	28,700	53,864	224,817
13.50	448.00	32,338	61,038	285,855
15.50	450.00	38,138	70,476	356,331

Culvert / Orifice Structures

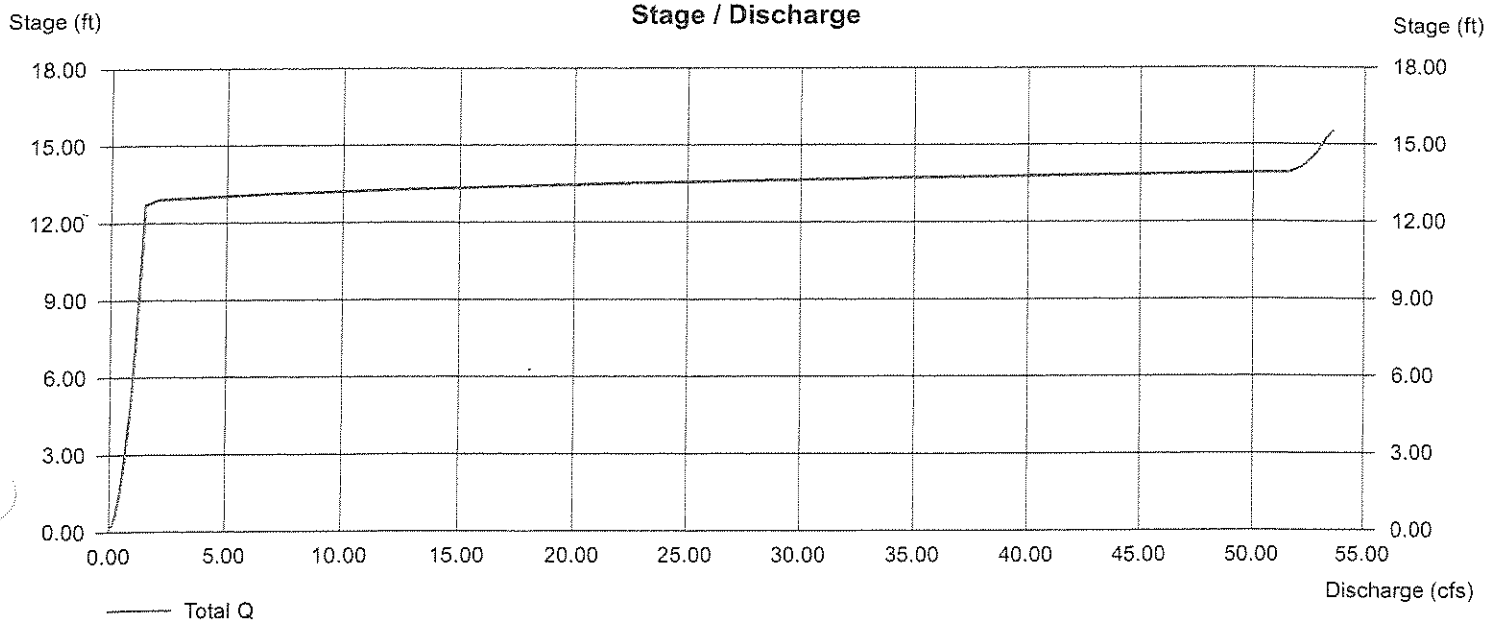
	[A]	[B]	[C]	[D]
Rise (in)	= 24.00	4.00	0.00	0.00
Span (in)	= 24.00	4.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 434.50	434.50	0.00	0.00
Length (ft)	= 110.00	0.00	0.00	0.00
Slope (%)	= 13.00	0.00	0.00	0.00
N-Value	= .024	.013	.013	.013
Orif. Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	Yes

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	30.00	0.00	0.00
Crest El. (ft)	= 447.34	448.13	0.00	0.00
Weir Coeff.	= 3.33	3.33	0.00	0.00
Weir Type	= Riser	Ciplti	---	---
Multi-Stage	= Yes	Yes	No	No

Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control. Weir riser checked for orifice conditions.



Hydrograph Summary Report

Hyd.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	142.46	2	718	332,123	----	------	------	Basin 1 Subarea 2
2	SCS Runoff	22.68	2	716	46,263	----	------	------	Basin 1 Subarea 1
3	SCS Runoff	16.41	2	716	38,621	----	------	------	Basin 1 Subarea 3
4	Combine	180.41	2	718	417,006	1, 2, 3	------	------	Combined Discharge to Pro. Basin 1
5	Reservoir	7.90	2	806	406,496	4	447.63	274,626	B1DA to Mod Basin 1

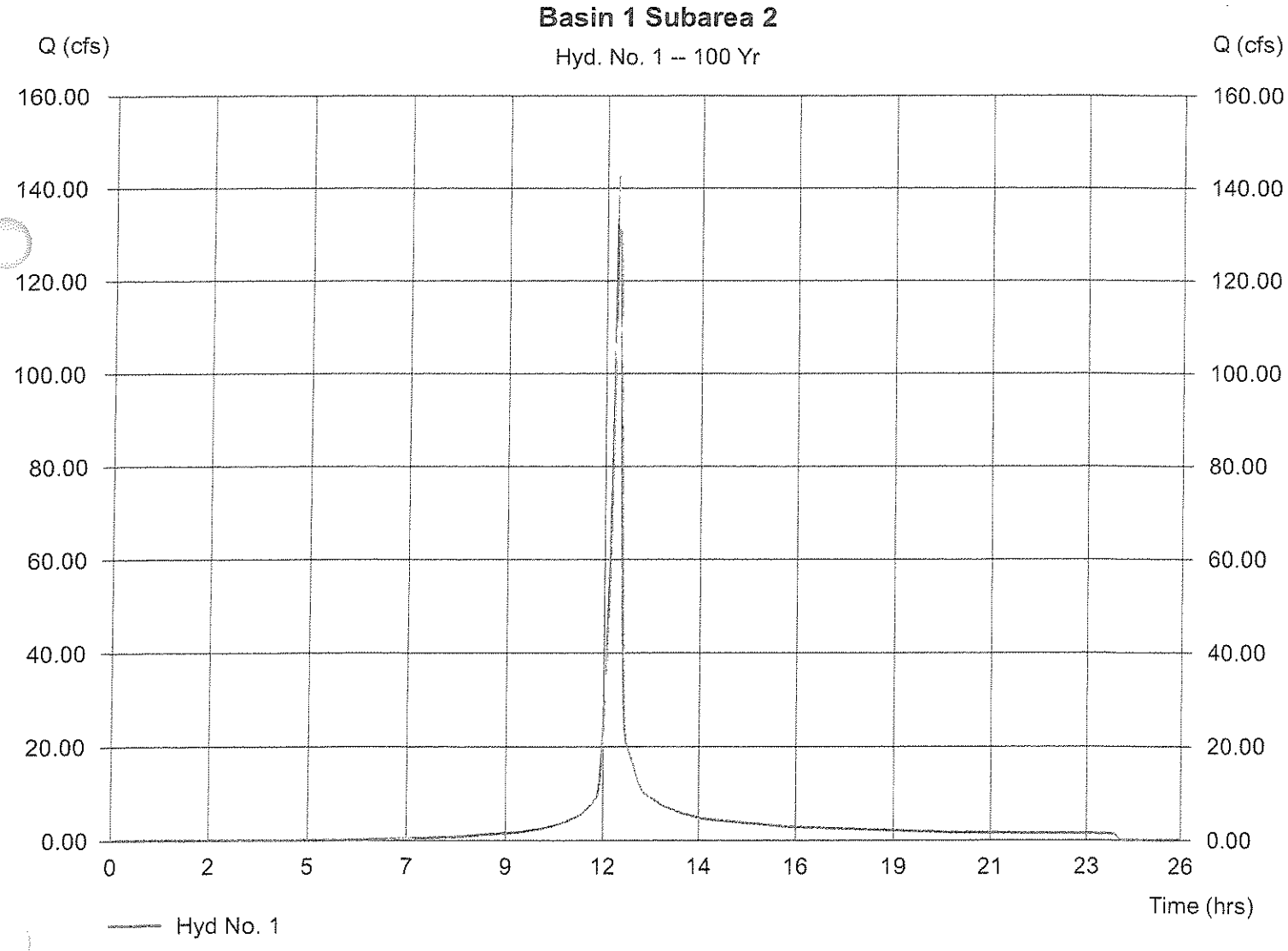
Hydrograph Plot

Hyd. No. 1

Basin 1 Subarea 2

Hydrograph type	= SCS Runoff	Peak discharge	= 142.46 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Drainage area	= 18.340 ac	Curve number	= 79
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 9.40 min
Total precip.	= 7.44 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 332,123 cuft



TR55 Tc Worksheet

Hyd. No. 1

Basin 1 Subarea 2

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.130		0.011		0.011		
Flow length (ft)	= 120.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.00		0.00		0.00		
Land slope (%)	= 33.00		0.00		0.00		
Travel Time (min)	**= 3.40**	**+**	**0.00**	**+**	**0.00**	**=**	**3.40**
Shallow Concentrated Flow							
Flow length (ft)	= 786.00		0.00		0.00		
Watercourse slope (%)	= 3.00		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	= 2.79		0.00		0.00		
Travel Time (min)	**= 4.69**	**+**	**0.00**	**+**	**0.00**	**=**	**4.69**
Channel Flow							
X sectional flow area (sqft)	= 4.50		3.53		0.00		
Wetted perimeter (ft)	= 6.50		4.71		0.00		
Channel slope (%)	= 33.00		33.00		0.00		
Manning's n-value	= 0.070		0.010		0.015		
Velocity (ft/s)	= 9.56		70.56		0.00		
Flow length (ft)	= 686.0		372.0		0.0		
Travel Time (min)	**= 1.20**	**+**	**0.09**	**+**	**0.00**	**=**	**1.28**

Total Travel Time, Tc ..... 9.40 min

Hydrograph Plot

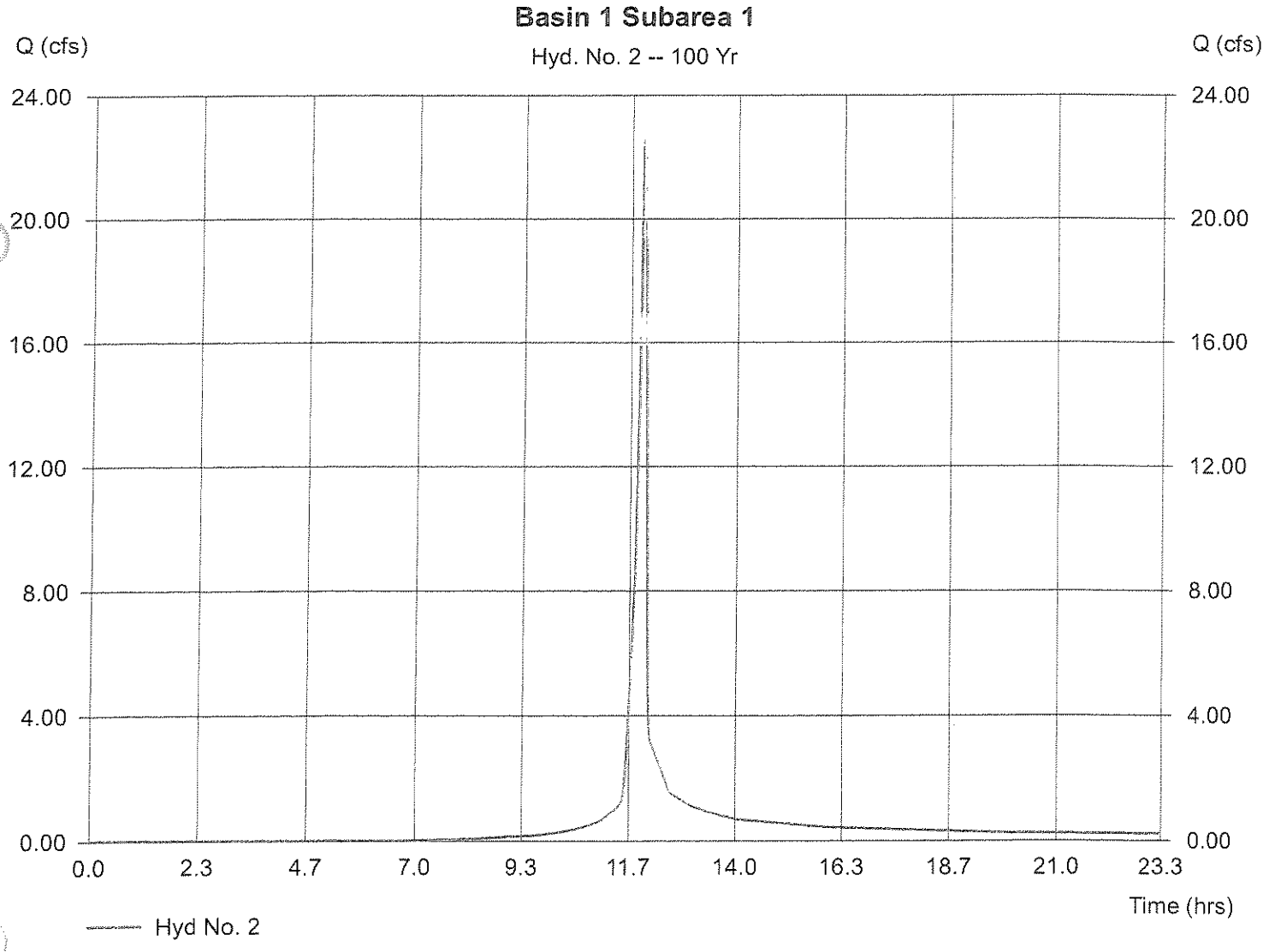
Hydraflow Hydrographs by Intelisolve | Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 2

Basin 1 Subarea 1

Hydrograph type	= SCS Runoff	Peak discharge	= 22.68 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Drainage area	= 3.070 ac	Curve number	= 74
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 7.44 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 46,263 cuft



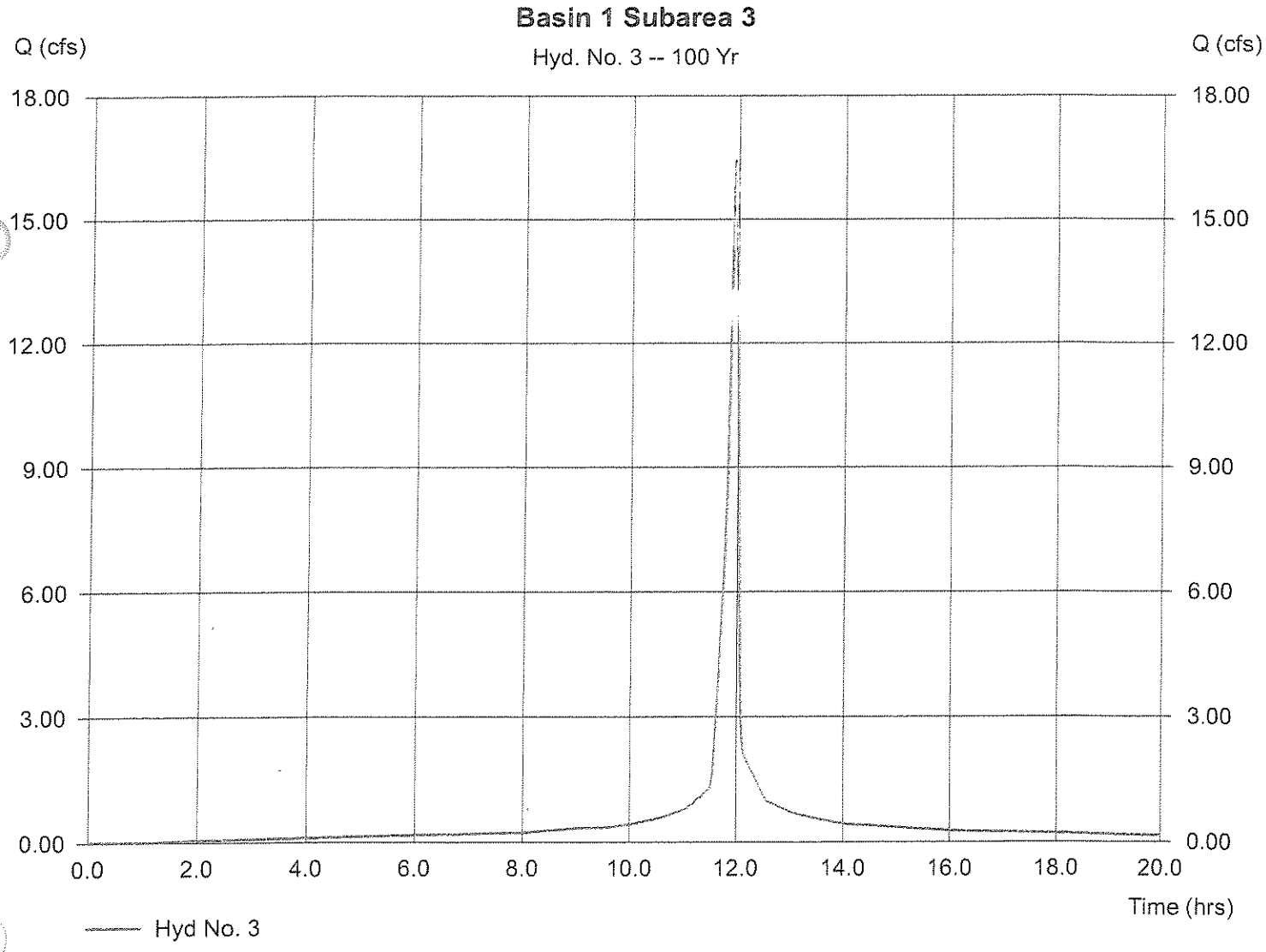
Hydrograph Plot

Hyd. No. 3

Basin 1 Subarea 3

Hydrograph type	= SCS Runoff	Peak discharge	= 16.41 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Drainage area	= 1.630 ac	Curve number	= 96
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 5.00 min
Total precip.	= 7.44 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 38,621 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

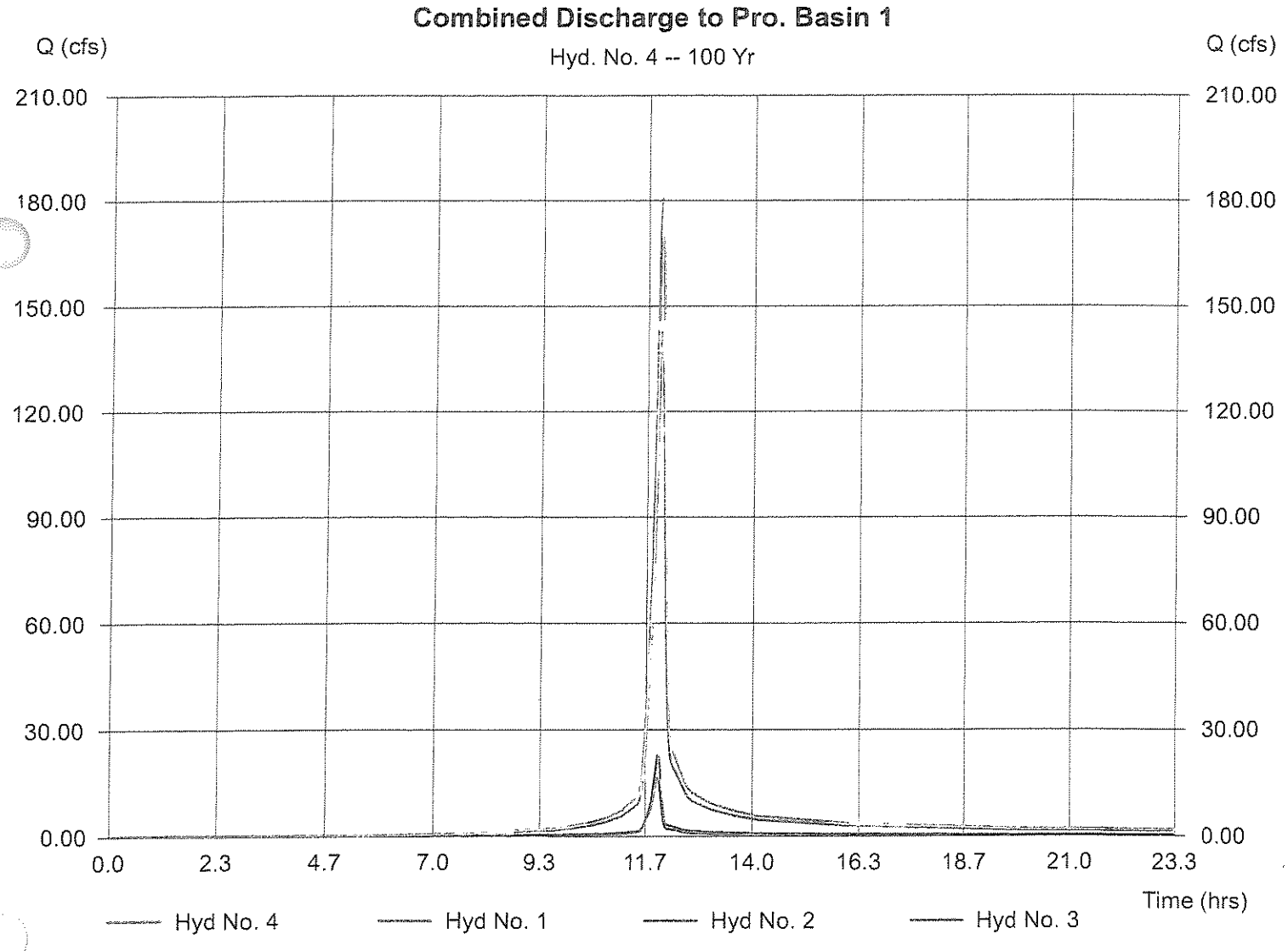
Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 4

Combined Discharge to Pro. Basin 1

Hydrograph type	= Combine	Peak discharge	= 180.41 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Inflow hyds.	= 1, 2, 3		

Hydrograph Volume = 417,006 cuft



Hydrograph Plot

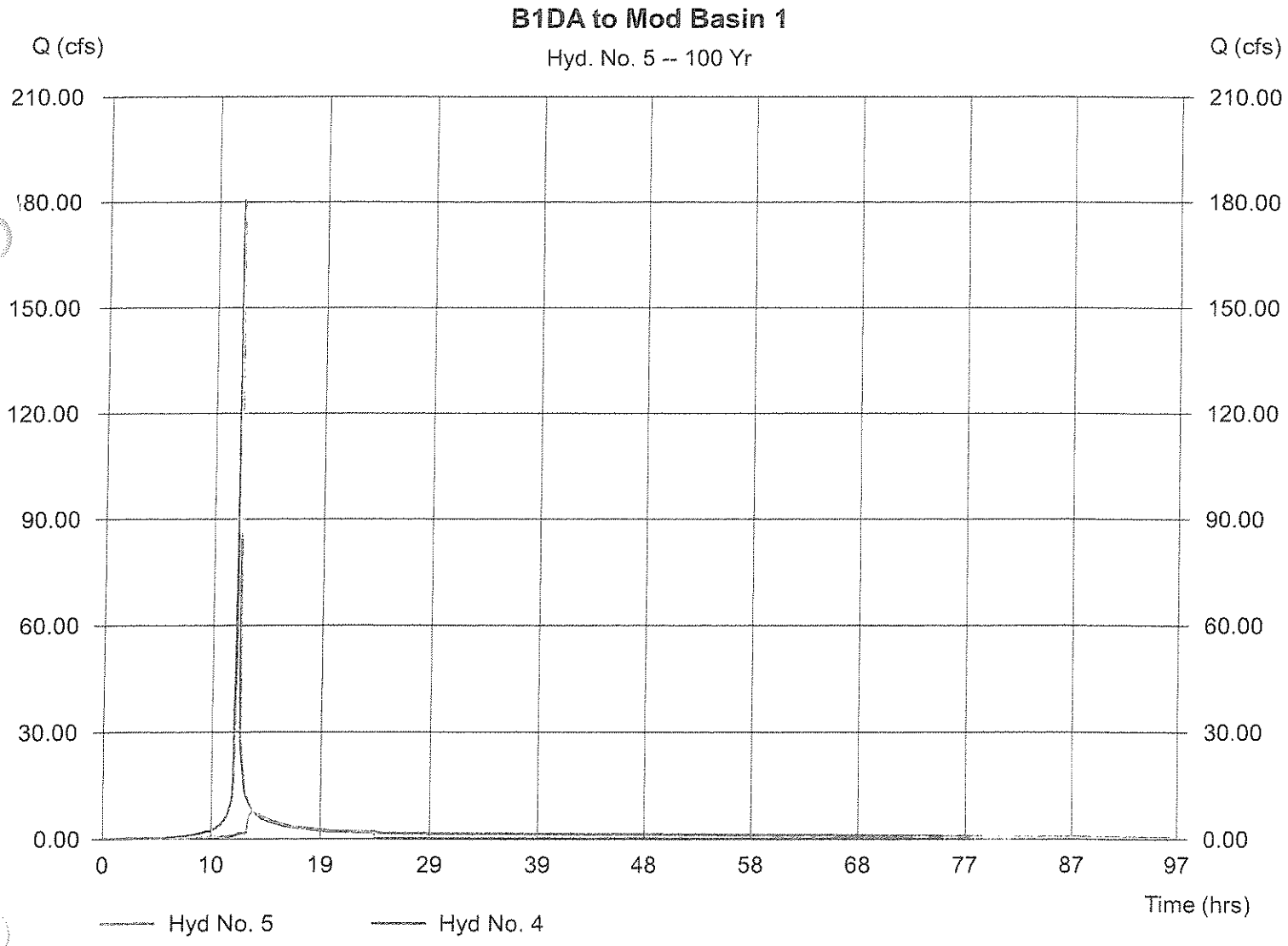
Hydraflow Hydrographs by Intelisolve | Wednesday, Sep 4 2019, 6:47 PM

Hyd. No. 5

B1DA to Mod Basin 1

Hydrograph type	= Reservoir	Peak discharge	= 7.90 cfs
Storm frequency	= 100 yrs	Time interval	= 2 min
Inflow hyd. No.	= 4	Max. Elevation	= 447.63 ft
Reservoir name	= Pro. SW Basin 1 wPond	Max. Storage	= 274,626 cuft

Storage Indication method used. | Hydrograph Volume = 406,496 cuft



Pond Report

Pond No. 1 - Pro. SW Basin 1 wPond

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	434.50	12,000	0	0
1.50	436.00	13,571	19,178	19,178
3.50	438.00	15,671	29,242	48,420
5.50	440.00	18,793	34,464	82,884
7.50	442.00	22,056	40,849	123,733
9.50	444.00	25,164	47,220	170,953
11.50	446.00	28,700	53,864	224,817
13.50	448.00	32,338	61,038	285,855
15.50	450.00	38,138	70,476	356,331

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise (in)	= 24.00	4.00	0.00	0.00
Span (in)	= 24.00	4.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 434.50	434.50	0.00	0.00
Length (ft)	= 110.00	0.00	0.00	0.00
Slope (%)	= 13.00	0.00	0.00	0.00
N-Value	= .024	.013	.013	.013
Orif. Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	Yes

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	30.00	0.00	0.00
Crest El. (ft)	= 447.34	448.13	0.00	0.00
Weir Coeff.	= 3.33	3.33	0.00	0.00
Weir Type	= Riser	Ciplti	---	---
Multi-Stage	= Yes	Yes	No	No

Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 0.00 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control. Weir riser checked for orifice conditions.

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0	434.50	0.00	0.00	---	---	0.00	0.00	---	---	---	0.00
0.15	1,918	434.65	0.05	0.05	---	---	0.00	0.00	---	---	---	0.05
0.30	3,836	434.80	0.16	0.15	---	---	0.00	0.00	---	---	---	0.15
0.45	5,753	434.95	0.22	0.22	---	---	0.00	0.00	---	---	---	0.22
0.60	7,671	435.10	0.27	0.27	---	---	0.00	0.00	---	---	---	0.27
0.75	9,589	435.25	0.32	0.31	---	---	0.00	0.00	---	---	---	0.31
0.90	11,507	435.40	0.35	0.34	---	---	0.00	0.00	---	---	---	0.34
1.05	13,425	435.55	0.38	0.38	---	---	0.00	0.00	---	---	---	0.38
1.20	15,343	435.70	0.41	0.41	---	---	0.00	0.00	---	---	---	0.41
1.35	17,260	435.85	0.44	0.44	---	---	0.00	0.00	---	---	---	0.44
1.50	19,178	436.00	0.48	0.47	---	---	0.00	0.00	---	---	---	0.47
1.70	22,102	436.20	0.52	0.50	---	---	0.00	0.00	---	---	---	0.50
1.90	25,027	436.40	0.56	0.53	---	---	0.00	0.00	---	---	---	0.53
2.10	27,951	436.60	0.56	0.56	---	---	0.00	0.00	---	---	---	0.56
2.30	30,875	436.80	0.60	0.59	---	---	0.00	0.00	---	---	---	0.59
2.50	33,799	437.00	0.64	0.62	---	---	0.00	0.00	---	---	---	0.62
2.70	36,723	437.20	0.65	0.65	---	---	0.00	0.00	---	---	---	0.65
2.90	39,648	437.40	0.69	0.67	---	---	0.00	0.00	---	---	---	0.67
3.10	42,572	437.60	0.73	0.70	---	---	0.00	0.00	---	---	---	0.70
3.30	45,496	437.80	0.73	0.72	---	---	0.00	0.00	---	---	---	0.72
3.50	48,420	438.00	0.75	0.75	---	---	0.00	0.00	---	---	---	0.75
3.70	51,867	438.20	0.78	0.77	---	---	0.00	0.00	---	---	---	0.77
3.90	55,313	438.40	0.79	0.79	---	---	0.00	0.00	---	---	---	0.79
4.10	58,759	438.60	0.84	0.81	---	---	0.00	0.00	---	---	---	0.81
4.30	62,206	438.80	0.84	0.83	---	---	0.00	0.00	---	---	---	0.83
4.50	65,652	439.00	0.89	0.85	---	---	0.00	0.00	---	---	---	0.85
4.70	69,099	439.20	0.89	0.87	---	---	0.00	0.00	---	---	---	0.87
4.90	72,545	439.40	0.89	0.89	---	---	0.00	0.00	---	---	---	0.89
5.10	75,991	439.60	0.95	0.91	---	---	0.00	0.00	---	---	---	0.91

Continues on next page...

Pro. SW Basin 1 wPond

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
5.30	79,438	439.80	0.95	0.93	---	---	0.00	0.00	---	---	---	0.93
5.50	82,884	440.00	0.95	0.95	---	---	0.00	0.00	---	---	---	0.95
5.70	86,969	440.20	1.00	0.97	---	---	0.00	0.00	---	---	---	0.97
5.90	91,054	440.40	1.00	0.99	---	---	0.00	0.00	---	---	---	0.99
6.10	95,139	440.60	1.00	1.00	---	---	0.00	0.00	---	---	---	1.00
6.30	99,224	440.80	1.02	1.02	---	---	0.00	0.00	---	---	---	1.02
6.50	103,309	441.00	1.07	1.04	---	---	0.00	0.00	---	---	---	1.04
6.70	107,394	441.20	1.07	1.05	---	---	0.00	0.00	---	---	---	1.05
6.90	111,479	441.40	1.07	1.07	---	---	0.00	0.00	---	---	---	1.07
7.10	115,563	441.60	1.13	1.09	---	---	0.00	0.00	---	---	---	1.09
7.30	119,648	441.80	1.13	1.10	---	---	0.00	0.00	---	---	---	1.10
7.50	123,733	442.00	1.13	1.12	---	---	0.00	0.00	---	---	---	1.12
7.70	128,455	442.20	1.13	1.13	---	---	0.00	0.00	---	---	---	1.13
7.90	133,177	442.40	1.20	1.15	---	---	0.00	0.00	---	---	---	1.15
8.10	137,899	442.60	1.20	1.16	---	---	0.00	0.00	---	---	---	1.16
8.30	142,621	442.80	1.20	1.18	---	---	0.00	0.00	---	---	---	1.18
8.50	147,343	443.00	1.20	1.19	---	---	0.00	0.00	---	---	---	1.19
8.70	152,065	443.20	1.21	1.21	---	---	0.00	0.00	---	---	---	1.21
8.90	156,787	443.40	1.26	1.22	---	---	0.00	0.00	---	---	---	1.22
9.10	161,509	443.60	1.26	1.24	---	---	0.00	0.00	---	---	---	1.24
9.30	166,231	443.80	1.26	1.25	---	---	0.00	0.00	---	---	---	1.25
9.50	170,953	444.00	1.26	1.26	---	---	0.00	0.00	---	---	---	1.26
9.70	176,340	444.20	1.28	1.28	---	---	0.00	0.00	---	---	---	1.28
9.90	181,726	444.40	1.34	1.29	---	---	0.00	0.00	---	---	---	1.29
10.10	187,113	444.60	1.34	1.30	---	---	0.00	0.00	---	---	---	1.30
10.30	192,499	444.80	1.34	1.32	---	---	0.00	0.00	---	---	---	1.32
10.50	197,885	445.00	1.34	1.33	---	---	0.00	0.00	---	---	---	1.33
10.70	203,272	445.20	1.34	1.34	---	---	0.00	0.00	---	---	---	1.34
10.90	208,658	445.40	1.41	1.36	---	---	0.00	0.00	---	---	---	1.36
11.10	214,045	445.60	1.41	1.37	---	---	0.00	0.00	---	---	---	1.37
11.30	219,431	445.80	1.41	1.38	---	---	0.00	0.00	---	---	---	1.38
11.50	224,817	446.00	1.41	1.39	---	---	0.00	0.00	---	---	---	1.39
11.70	230,921	446.20	1.41	1.41	---	---	0.00	0.00	---	---	---	1.41
11.90	237,025	446.40	1.42	1.42	---	---	0.00	0.00	---	---	---	1.42
12.10	243,129	446.60	1.48	1.43	---	---	0.00	0.00	---	---	---	1.43
12.30	249,232	446.80	1.48	1.44	---	---	0.00	0.00	---	---	---	1.44
12.50	255,336	447.00	1.48	1.46	---	---	0.00	0.00	---	---	---	1.46
12.70	261,440	447.20	1.48	1.47	---	---	0.00	0.00	---	---	---	1.47
12.90	267,544	447.40	2.08	1.47	---	---	0.59	0.00	---	---	---	2.06
13.10	273,648	447.60	6.85	1.45	---	---	5.30	0.00	---	---	---	6.75
13.30	279,752	447.80	13.90	1.42	---	---	12.47	0.00	---	---	---	13.89
13.50	285,855	448.00	22.77	1.34	---	---	21.43	0.00	---	---	---	22.77
13.70	292,903	448.20	34.86	1.14	---	---	31.87	1.85	---	---	---	34.86
13.90	299,950	448.40	51.61	0.31	---	---	37.28	14.02	---	---	---	51.61
14.10	306,998	448.60	52.21	0.16	---	---	28.68	23.36	---	---	---	52.20
14.30	314,046	448.80	52.48	0.11	---	---	25.63	26.73	---	---	---	52.46
14.50	321,093	449.00	52.71	0.09	---	---	22.81	29.80	---	---	---	52.70
14.70	328,141	449.20	52.92	0.07	---	---	20.12	32.72	---	---	---	52.91
14.90	335,188	449.40	53.12	0.06	---	---	17.98	35.01	---	---	---	53.05
15.10	342,236	449.60	53.32	0.05	---	---	16.27	36.90	---	---	---	53.22
15.30	349,284	449.80	53.52	0.05	---	---	14.86	38.47	---	---	---	53.37
15.50	356,331	450.00	53.72	0.04	---	---	13.70	39.90	---	---	---	53.64

...End

Bethlehem Landfill Company

Northern Realignment

Post Construction Stormwater Management - Extended Basin #2

Initial Basin El. 460.00

JTF

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	2 yr - 24 hr
Rainfall Depth:	3.000 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#2	==>	#4	0.000	0.000	CHANNEL-CC
Null	#3	==>	#2	0.000	0.000	DS-8
Null	#4	==>	#6	0.000	0.000	CHANNEL BB
Null	#5	==>	#4	0.000	0.000	DS-9
Null	#6	==>	#7	0.000	0.000	CHANNEL N
Pond	#7	==>	End	0.000	0.000	BASIN 2
Null	#8	==>	#6	0.000	0.000	CHANNEL AA
Null	#9	==>	#6	0.000	0.000	DS-7
Null	#10	==>	#7	0.000	0.000	DS-6
Null	#11	==>	#6	0.000	0.000	CHANNEL Z
Null	#12	==>	#7	0.000	0.000	CHANNEL M
Null	#13	==>	#7	0.000	0.000	I-19

#13
Null

#12
Null

#10
Null

#11
Null

#9
Null

#8
Null

#5
Null

#3
Null

#2
Null

#4
Null

#6
Null

#7
Pond

Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#13		0.770	0.770	0.45	0.03
#12		2.960	2.960	4.91	0.39
#10		9.050	9.050	11.87	0.90
#11		0.710	0.710	0.77	0.06
#9		14.140	14.140	7.88	0.94
#8		0.650	0.650	1.04	0.08
#5		12.990	12.990	6.02	0.86
#3		18.180	18.180	10.39	1.21
#2		5.060	23.240	14.04	1.62
#4		5.450	41.680	23.66	2.90
#6		1.530	58.710	32.21	4.09
#7	In	2.070	73.560	47.37	5.51
	Out			0.28	0.85

Structure Detail:

Structure #13 (Null)

I-19

Structure #12 (Null)

CHANNEL M

Structure #10 (Null)

DS-6

Structure #11 (Null)

CHANNEL Z

Structure #9 (Null)

DS-7

Structure #8 (Null)

CHANNEL AA

Structure #5 (Null)

DS-9

Structure #3 (Null)

DS-8

Structure #2 (Null)

CHANNEL-CC

Structure #4 (Null)

CHANNEL BB

Structure #6 (Null)

CHANNEL N

Structure #7 (Pond)

BASIN 2

Pond Inputs:

Initial Pool Elev:	460.01 ft

Initial Pool:	0.01 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Number of Holes per Elev
36.00	16.25	30.00	100.00	4.50	0.0240	476.25	1

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
476.95	20.00	4.00:1	4.00:1	60.00

Pond Results:

Peak Elevation:	467.16 ft
Dewater Time:	14.67 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
460.00	0.600	0.000	0.000		
460.01	0.600	0.006	0.000		Low hole SPW #1
460.50	0.602	0.300	0.074	48.46*	
461.00	0.604	0.602	0.105	34.90*	
461.50	0.606	0.904	0.128	28.54*	
462.00	0.608	1.208	0.148	24.78*	
462.50	0.638	1.519	0.166	22.74*	
463.00	0.669	1.846	0.182	21.76*	
463.50	0.701	2.189	0.196	21.12*	
464.00	0.733	2.547	0.210	20.67*	
464.50	0.766	2.922	0.223	20.37*	
465.00	0.900	3.338	0.235	21.45*	
465.50	0.828	3.770	0.246	21.23*	
466.00	0.856	4.191	0.257	19.81*	
466.50	0.885	4.626	0.268	19.68*	
467.00	0.914	5.076	0.278	19.59*	
467.16	0.924	5.224	0.281	6.95	Peak Stage
467.50	0.944	5.540	0.287		
468.00	0.974	6.020	0.371		
468.50	1.005	6.514	0.411		

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
469.00	1.036	7.025	0.444		
469.50	1.068	7.551	0.472		
470.00	1.100	8.093	0.795		
470.50	1.128	8.650	0.942		
471.00	1.157	9.221	1.059		
471.50	1.186	9.807	1.160		
472.00	1.216	10.407	1.251		
472.50	1.300	11.036	1.334		
473.00	1.276	11.680	1.411		
473.50	1.306	12.325	1.484		
474.00	1.337	12.986	1.552		
474.50	1.368	13.662	1.617		
474.53	1.370	13.703	1.621		
474.75	1.384	14.006	1.649		
475.00	1.400	14.354	1.680		
475.33	1.416	14.819	6.607		
475.50	1.425	15.060	7.756		
475.54	1.427	15.117	7.997		
475.75	1.437	15.418	9.138		
475.80	1.440	15.490	9.385		
476.00	1.450	15.779	10.306		
476.25	1.462	16.143	11.339		Spillway #1
476.50	1.475	16.510	12.274		
476.75	1.487	16.880	13.137		
476.95	1.497	17.179	17.112		Spillway #2
477.00	1.500	17.254	19.962		
477.50	1.550	18.016	48.891		
478.00	1.600	18.804	187.682		
478.50	1.650	19.616	341.764		
478.53	1.660	19.666	342.103		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
460.00	0.000	0.000	0.000
460.01	2.00>0.000	0.000	0.000
460.50	0.074	0.000	0.074
461.00	0.105	0.000	0.105
461.50	0.128	0.000	0.128
462.00	0.148	0.000	0.148
462.50	0.166	0.000	0.166
463.00	0.182	0.000	0.182
463.50	0.196	0.000	0.196
464.00	0.210	0.000	0.210
464.50	0.223	0.000	0.223
465.00	0.235	0.000	0.235
465.50	0.246	0.000	0.246
466.00	0.257	0.000	0.257
466.50	0.268	0.000	0.268
467.00	0.278	0.000	0.278
467.50	2.00>0.287	0.000	0.287
468.00	0.371	0.000	0.371
468.50	0.411	0.000	0.411
469.00	0.444	0.000	0.444
469.50	4.00>0.472	0.000	0.472
470.00	0.795	0.000	0.795
470.50	0.942	0.000	0.942
471.00	1.059	0.000	1.059
471.50	1.160	0.000	1.160
472.00	1.251	0.000	1.251
472.50	1.334	0.000	1.334
473.00	1.411	0.000	1.411
473.50	1.484	0.000	1.484
474.00	1.552	0.000	1.552
474.50	1.617	0.000	1.617
474.53	1.621	0.000	1.621
474.75	1.649	0.000	1.649
475.00	18.00>1.680	0.000	1.680
475.33	6.607	0.000	6.607
475.50	7.756	0.000	7.756
475.54	7.997	0.000	7.997
475.75	9.138	0.000	9.138
475.80	9.385	0.000	9.385
476.00	10.306	0.000	10.306

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
476.25	11.339	0.000	11.339
476.50	12.274	0.000	12.274
476.75	13.137	0.000	13.137
476.95	17.112	0.000	17.112
477.00	18.977	0.985	19.962
477.50	38.052	10.838	48.891
478.00	45.024	142.658	187.682
478.50	51.053	290.711	341.764
478.53	51.392	290.711	342.103

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#13	1	0.770	0.120	0.000	0.000	65.000	S	0.45	0.032
	Σ	**0.770**						**0.45**	**0.032**
#12	1	2.960	0.045	0.000	0.000	85.000	M	4.91	0.391
	Σ	**2.960**						**4.91**	**0.391**
#10	1	9.050	0.116	0.000	0.000	79.000	S	11.87	0.895
	Σ	**9.050**						**11.87**	**0.895**
#11	1	0.710	0.023	0.000	0.000	75.000	M	0.77	0.057
	Σ	**0.710**						**0.77**	**0.057**
#9	1	14.140	0.230	0.000	0.000	79.000	S	7.88	0.939
	Σ	**14.140**						**7.88**	**0.939**
#8	1	0.650	0.039	0.000	0.000	84.000	M	1.04	0.081
	Σ	**0.650**						**1.04**	**0.081**
#5	1	12.990	0.335	0.000	0.000	79.000	S	6.02	0.861
	Σ	**12.990**						**6.02**	**0.861**
#3	1	18.180	0.216	0.000	0.000	79.000	S	10.39	1.206
	Σ	**18.180**						**10.39**	**1.206**
#2	1	5.060	0.163	0.000	0.000	83.000	S	3.87	0.411
	Σ	**23.240**						**14.04**	**1.618**
#4	1	5.450	0.164	0.000	0.000	82.000	S	3.97	0.422
	Σ	**41.680**						**23.66**	**2.901**
#6	1	1.530	0.027	0.000	0.000	74.000	M	1.59	0.116
	Σ	**58.710**						**32.21**	**4.094**
#7	1	2.070	0.015	0.000	0.000	66.000	M	1.31	0.094
	Σ	**73.560**						**47.37**	**5.507**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#2	1	3. Short grass pasture	28.00	28.00	100.00	4.230	0.006
		8. Large gullies, diversions, and low flowing streams	0.50	6.00	1,200.00	2.120	0.157

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#2	**1**	**Time of Concentration:**					**0.163**
#3	1	3. Short grass pasture	3.00	4.50	150.00	1.380	0.030
		3. Short grass pasture	3.00	19.85	661.66	1.380	0.133
		3. Short grass pasture	29.00	17.98	62.00	4.300	0.004
		6. Grassed waterway	2.56	10.49	410.00	2.390	0.047
		8. Large gullies, diversions, and low flowing streams	17.08	17.25	100.99	12.390	0.002
#3	**1**	**Time of Concentration:**					**0.216**
#4	1	3. Short grass pasture	28.21	22.00	77.98	4.240	0.005
		6. Grassed waterway	3.00	28.34	944.66	2.590	0.101
		8. Large gullies, diversions, and low flowing streams	0.50	2.25	450.00	2.120	0.058
#4	**1**	**Time of Concentration:**					**0.164**
#5	1	3. Short grass pasture	2.83	4.24	150.00	1.340	0.031
		3. Short grass pasture	3.02	22.77	753.97	1.390	0.150
		3. Short grass pasture	26.47	17.99	67.96	4.110	0.004
		6. Grassed waterway	2.99	41.97	1,403.67	2.590	0.150
		8. Large gullies, diversions, and low flowing streams	8.33	1.99	23.88	8.650	0.000
#5	**1**	**Time of Concentration:**					**0.335**
#6	1	6. Grassed waterway	40.00	80.00	200.00	9.480	0.005
		6. Grassed waterway	20.00	80.00	400.00	6.700	0.016
#6	**1**	**Time of Concentration:**					**0.027**
#7	1	3. Short grass pasture	5.00	5.00	100.00	1.780	0.015
#7	**1**	**Time of Concentration:**					**0.015**
#8	1	8. Large gullies, diversions, and low flowing streams	0.50	1.50	300.00	2.120	0.039
#8	**1**	**Time of Concentration:**					**0.039**
#9	1	3. Short grass pasture	2.83	4.24	150.00	1.340	0.031
		3. Short grass pasture	3.90	11.50	294.87	1.570	0.052
		6. Grassed waterway	3.05	41.93	1,374.75	2.610	0.146
		8. Large gullies, diversions, and low flowing streams	26.83	22.00	81.99	15.530	0.001
#9	**1**	**Time of Concentration:**					**0.230**
#10	1	3. Short grass pasture	33.00	24.75	75.00	4.590	0.004
		6. Grassed waterway	3.00	30.00	1,000.00	2.590	0.107
		8. Large gullies, diversions, and low flowing streams	33.00	115.50	350.00	17.230	0.005
#10	**1**	**Time of Concentration:**					**0.116**
#11	1	3. Short grass pasture	33.00	23.10	70.00	4.590	0.004
		6. Grassed waterway	2.00	3.00	150.00	2.120	0.019
#11	**1**	**Time of Concentration:**					**0.023**
#12	1	3. Short grass pasture	33.00	16.49	49.96	4.590	0.003
		6. Grassed waterway	12.00	96.00	800.00	5.190	0.042

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#12	**1**	**Time of Concentration:**					**0.045**

Bethlehem Landfill Company
Northern Realignment

Post Construction Stormwater Management - Extended Basin #2

Initial Basin El. 460.00

JTF

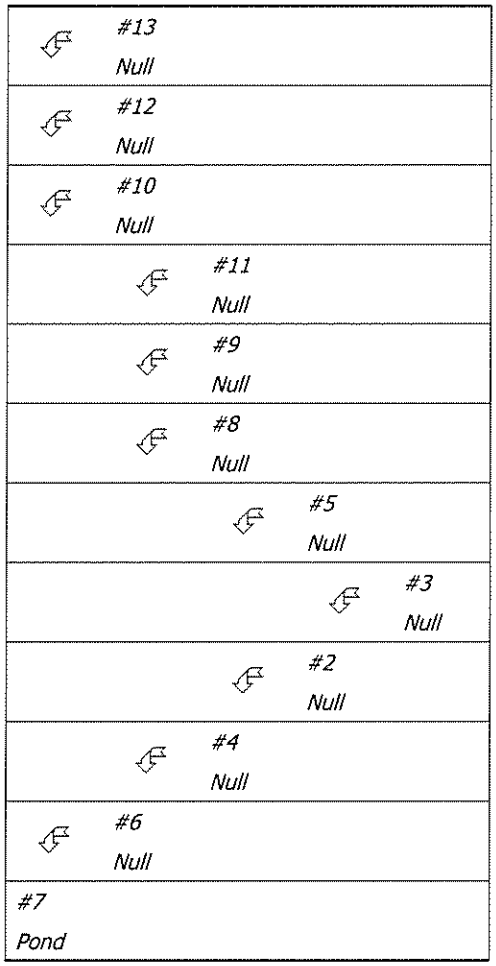
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 24 hr
Rainfall Depth:	4.560 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#2	==>	#4	0.000	0.000	CHANNEL-CC
Null	#3	==>	#2	0.000	0.000	DS-8
Null	#4	==>	#6	0.000	0.000	CHANNEL BB
Null	#5	==>	#4	0.000	0.000	DS-9
Null	#6	==>	#7	0.000	0.000	CHANNEL N
Pond	#7	==>	End	0.000	0.000	BASIN 2
Null	#8	==>	#6	0.000	0.000	CHANNEL AA
Null	#9	==>	#6	0.000	0.000	DS-7
Null	#10	==>	#7	0.000	0.000	DS-6
Null	#11	==>	#6	0.000	0.000	CHANNEL Z
Null	#12	==>	#7	0.000	0.000	CHANNEL M
Null	#13	==>	#7	0.000	0.000	I-19



Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#13	0.770	0.770	1.20	0.09
#12	2.960	2.960	8.64	0.73
#10	9.050	9.050	22.90	1.83
#11	0.710	0.710	1.60	0.12
#9	14.140	14.140	16.50	1.92
#8	0.650	0.650	1.86	0.15
#5	12.990	12.990	12.76	1.76
#3	18.180	18.180	21.69	2.46
#2	5.060	23.240	28.78	3.25
#4	5.450	41.680	48.45	5.84
#6	1.530	58.710	66.21	8.29
#7 In	2.070	73.560	98.30	11.18
#7 Out			1.21	3.13

Structure Detail:

Structure #13 (Null)

I-19

Structure #12 (Null)

CHANNEL M

Structure #10 (Null)

DS-6

Structure #11 (Null)

CHANNEL Z

Structure #9 (Null)

DS-7

Structure #8 (Null)

CHANNEL AA

Structure #5 (Null)

DS-9

Structure #3 (Null)

DS-8

Structure #2 (Null)

CHANNEL-CC

Structure #4 (Null)

CHANNEL BB

Structure #6 (Null)

CHANNEL N

Structure #7 (Pond)

BASIN 2

Pond Inputs:

Initial Pool Elev:	460.01 ft

Initial Pool:	0.01 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Number of Holes per Elev
36.00	16.25	30.00	100.00	4.50	0.0240	476.25	1

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
476.95	20.00	4.00:1	4.00:1	60.00

Pond Results:

Peak Elevation:	471.79 ft
Dewater Time:	18.98 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
460.00	0.600	0.000	0.000		
460.01	0.600	0.006	0.000		Low hole SPW #1
460.50	0.602	0.300	0.074	48.46*	
461.00	0.604	0.602	0.105	34.90*	
461.50	0.606	0.904	0.128	28.54*	
462.00	0.608	1.208	0.148	24.78*	
462.50	0.638	1.519	0.166	22.74*	
463.00	0.669	1.846	0.182	21.76*	
463.50	0.701	2.189	0.196	21.12*	
464.00	0.733	2.547	0.210	20.67*	
464.50	0.766	2.922	0.223	20.37*	
465.00	0.900	3.338	0.235	21.45*	
465.50	0.828	3.770	0.246	21.23*	
466.00	0.856	4.191	0.257	19.81*	
466.50	0.885	4.626	0.268	19.68*	
467.00	0.914	5.076	0.278	19.59*	
467.50	0.944	5.540	0.287	19.55*	
468.00	0.974	6.020	0.371	15.63*	
468.50	1.005	6.514	0.411	14.56*	
469.00	1.036	7.025	0.444	13.92*	

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
469.50	1.068	7.551	0.472	13.48*	
470.00	1.100	8.093	0.795	8.25*	
470.50	1.128	8.650	0.942	7.75	
471.00	1.157	9.221	1.059	6.90	
471.50	1.186	9.807	1.160	6.40	
471.79	1.204	10.159	1.213	4.00	Peak Stage
472.00	1.216	10.407	1.251		
472.50	1.300	11.036	1.334		
473.00	1.276	11.680	1.411		
473.50	1.306	12.325	1.484		
474.00	1.337	12.986	1.552		
474.50	1.368	13.662	1.617		
474.53	1.370	13.703	1.621		
474.75	1.384	14.006	1.649		
475.00	1.400	14.354	1.680		
475.33	1.416	14.819	6.607		
475.50	1.425	15.060	7.756		
475.54	1.427	15.117	7.997		
475.75	1.437	15.418	9.138		
475.80	1.440	15.490	9.385		
476.00	1.450	15.779	10.306		
476.25	1.462	16.143	11.339		Spillway #1
476.50	1.475	16.510	12.274		
476.75	1.487	16.880	13.137		
476.95	1.497	17.179	17.112		Spillway #2
477.00	1.500	17.254	19.962		
477.50	1.550	18.016	48.891		
478.00	1.600	18.804	187.682		
478.50	1.650	19.616	341.764		
478.53	1.660	19.666	342.103		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
460.00	0.000	0.000	0.000
460.01	2.00>0.000	0.000	0.000
460.50	0.074	0.000	0.074
461.00	0.105	0.000	0.105
461.50	0.128	0.000	0.128
462.00	0.148	0.000	0.148
462.50	0.166	0.000	0.166
463.00	0.182	0.000	0.182
463.50	0.196	0.000	0.196
464.00	0.210	0.000	0.210
464.50	0.223	0.000	0.223
465.00	0.235	0.000	0.235
465.50	0.246	0.000	0.246
466.00	0.257	0.000	0.257
466.50	0.268	0.000	0.268
467.00	0.278	0.000	0.278
467.50	2.00>0.287	0.000	0.287
468.00	0.371	0.000	0.371
468.50	0.411	0.000	0.411
469.00	0.444	0.000	0.444
469.50	4.00>0.472	0.000	0.472
470.00	0.795	0.000	0.795
470.50	0.942	0.000	0.942
471.00	1.059	0.000	1.059
471.50	1.160	0.000	1.160
472.00	1.251	0.000	1.251
472.50	1.334	0.000	1.334
473.00	1.411	0.000	1.411
473.50	1.484	0.000	1.484
474.00	1.552	0.000	1.552
474.50	1.617	0.000	1.617
474.53	1.621	0.000	1.621
474.75	1.649	0.000	1.649
475.00	18.00>1.680	0.000	1.680
475.33	6.607	0.000	6.607
475.50	7.756	0.000	7.756
475.54	7.997	0.000	7.997
475.75	9.138	0.000	9.138
475.80	9.385	0.000	9.385
476.00	10.306	0.000	10.306

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
476.25	11.339	0.000	11.339
476.50	12.274	0.000	12.274
476.75	13.137	0.000	13.137
476.95	17.112	0.000	17.112
477.00	18.977	0.985	19.962
477.50	38.052	10.838	48.891
478.00	45.024	142.658	187.682
478.50	51.053	290.711	341.764
478.53	51.392	290.711	342.103

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#13	1	0.770	0.120	0.000	0.000	65.000	S	1.20	0.088
	Σ	**0.770**						**1.20**	**0.088**
#12	1	2.960	0.045	0.000	0.000	85.000	M	8.64	0.730
	Σ	**2.960**						**8.64**	**0.730**
#10	1	9.050	0.116	0.000	0.000	79.000	S	22.90	1.828
	Σ	**9.050**						**22.90**	**1.828**
#11	1	0.710	0.023	0.000	0.000	75.000	M	1.60	0.124
	Σ	**0.710**						**1.60**	**0.124**
#9	1	14.140	0.230	0.000	0.000	79.000	S	16.50	1.918
	Σ	**14.140**						**16.50**	**1.918**
#8	1	0.650	0.039	0.000	0.000	84.000	M	1.86	0.155
	Σ	**0.650**						**1.86**	**0.155**
#5	1	12.990	0.335	0.000	0.000	79.000	S	12.76	1.759
	Σ	**12.990**						**12.76**	**1.759**
#3	1	18.180	0.216	0.000	0.000	79.000	S	21.69	2.464
	Σ	**18.180**						**21.69**	**2.464**
#2	1	5.060	0.163	0.000	0.000	83.000	S	7.38	0.790
	Σ	**23.240**						**28.78**	**3.254**
#4	1	5.450	0.164	0.000	0.000	82.000	S	7.71	0.824
	Σ	**41.680**						**48.45**	**5.837**
#6	1	1.530	0.027	0.000	0.000	74.000	M	3.35	0.257
	Σ	**58.710**						**66.21**	**8.290**
#7	1	2.070	0.015	0.000	0.000	66.000	M	3.38	0.247
	Σ	**73.560**						**98.30**	**11.183**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#2	1	3. Short grass pasture	28.00	28.00	100.00	4.230	0.006
		8. Large gullies, diversions, and low flowing streams	0.50	6.00	1,200.00	2.120	0.157

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#2	**1**	**Time of Concentration:**					**0.163**
#3	1	3. Short grass pasture	3.00	4.50	150.00	1.380	0.030
		3. Short grass pasture	3.00	19.85	661.66	1.380	0.133
		3. Short grass pasture	29.00	17.98	62.00	4.300	0.004
		6. Grassed waterway	2.56	10.49	410.00	2.390	0.047
		8. Large gullies, diversions, and low flowing streams	17.08	17.25	100.99	12.390	0.002
#3	**1**	**Time of Concentration:**					**0.216**
#4	1	3. Short grass pasture	28.21	22.00	77.98	4.240	0.005
		6. Grassed waterway	3.00	28.34	944.66	2.590	0.101
		8. Large gullies, diversions, and low flowing streams	0.50	2.25	450.00	2.120	0.058
#4	**1**	**Time of Concentration:**					**0.164**
#5	1	3. Short grass pasture	2.83	4.24	150.00	1.340	0.031
		3. Short grass pasture	3.02	22.77	753.97	1.390	0.150
		3. Short grass pasture	26.47	17.99	67.96	4.110	0.004
		6. Grassed waterway	2.99	41.97	1,403.67	2.590	0.150
		8. Large gullies, diversions, and low flowing streams	8.33	1.99	23.88	8.650	0.000
#5	**1**	**Time of Concentration:**					**0.335**
#6	1	6. Grassed waterway	40.00	80.00	200.00	9.480	0.005
		6. Grassed waterway	20.00	80.00	400.00	6.700	0.016
#6	**1**	**Time of Concentration:**					**0.027**
#7	1	3. Short grass pasture	5.00	5.00	100.00	1.780	0.015
#7	**1**	**Time of Concentration:**					**0.015**
#8	1	8. Large gullies, diversions, and low flowing streams	0.50	1.50	300.00	2.120	0.039
#8	**1**	**Time of Concentration:**					**0.039**
#9	1	3. Short grass pasture	2.83	4.24	150.00	1.340	0.031
		3. Short grass pasture	3.90	11.50	294.87	1.570	0.052
		6. Grassed waterway	3.05	41.93	1,374.75	2.610	0.146
		8. Large gullies, diversions, and low flowing streams	26.83	22.00	81.99	15.530	0.001
#9	**1**	**Time of Concentration:**					**0.230**
#10	1	3. Short grass pasture	33.00	24.75	75.00	4.590	0.004
		6. Grassed waterway	3.00	30.00	1,000.00	2.590	0.107
		8. Large gullies, diversions, and low flowing streams	33.00	115.50	350.00	17.230	0.005
#10	**1**	**Time of Concentration:**					**0.116**
#11	1	3. Short grass pasture	33.00	23.10	70.00	4.590	0.004
		6. Grassed waterway	2.00	3.00	150.00	2.120	0.019
#11	**1**	**Time of Concentration:**					**0.023**
#12	1	3. Short grass pasture	33.00	16.49	49.96	4.590	0.003
		6. Grassed waterway	12.00	96.00	800.00	5.190	0.042

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#12	**1**	**Time of Concentration:**					**0.045**

Bethlehem Landfill Company
Northern Realignment

Post Construction Stormwater Management - Extended Basin #2

Initial Basin El. 460.00

JTF

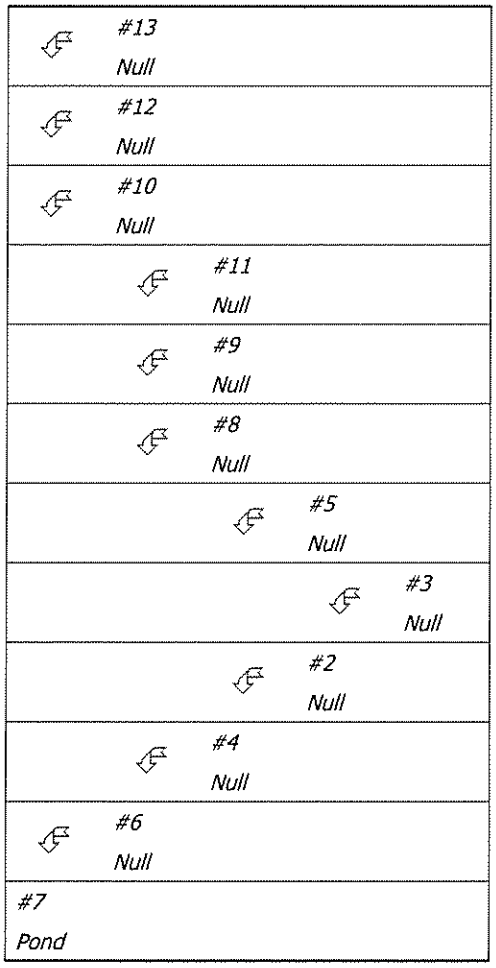
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	25 yr - 24 hr
Rainfall Depth:	5.520 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#2	==>	#4	0.000	0.000	CHANNEL-CC
Null	#3	==>	#2	0.000	0.000	DS-8
Null	#4	==>	#6	0.000	0.000	CHANNEL BB
Null	#5	==>	#4	0.000	0.000	DS-9
Null	#6	==>	#7	0.000	0.000	CHANNEL N
Pond	#7	==>	End	0.000	0.000	BASIN 2
Null	#8	==>	#6	0.000	0.000	CHANNEL AA
Null	#9	==>	#6	0.000	0.000	DS-7
Null	#10	==>	#7	0.000	0.000	DS-6
Null	#11	==>	#6	0.000	0.000	CHANNEL Z
Null	#12	==>	#7	0.000	0.000	CHANNEL M
Null	#13	==>	#7	0.000	0.000	I-19



Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#13		0.770	0.770	1.73	0.13
#12		2.960	2.960	10.93	0.95
#10		9.050	9.050	29.89	2.45
#11		0.710	0.710	2.14	0.17
#9		14.140	14.140	22.14	2.57
#8		0.650	0.650	2.36	0.20
#5		12.990	12.990	17.18	2.36
#3		18.180	18.180	29.08	3.30
#2		5.060	23.240	38.45	4.34
#4		5.450	41.680	64.81	7.79
#6		1.530	58.710	88.50	11.09
#7	In	2.070	73.560	131.61	14.98
	Out			1.60	4.49

Structure Detail:

Structure #13 (Null)

I-19

Structure #12 (Null)

CHANNEL M

Structure #10 (Null)

DS-6

Structure #11 (Null)

CHANNEL Z

Structure #9 (Null)

DS-7

Structure #8 (Null)

CHANNEL AA

Structure #5 (Null)

DS-9

Structure #3 (Null)

DS-8

Structure #2 (Null)

CHANNEL-CC

Structure #4 (Null)

CHANNEL BB

Structure #6 (Null)

CHANNEL N

Structure #7 (Pond)

BASIN 2

Pond Inputs:

Initial Pool Elev:	460.01 ft

Initial Pool:	0.01 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Number of Holes per Elev
36.00	16.25	30.00	100.00	4.50	0.0240	476.25	1

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
476.95	20.00	4.00:1	4.00:1	60.00

Pond Results:

Peak Elevation:	474.36 ft
Dewater Time:	20.10 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
460.00	0.600	0.000	0.000		
460.01	0.600	0.006	0.000		Low hole SPW #1
460.50	0.602	0.300	0.074	48.46*	
461.00	0.604	0.602	0.105	34.90*	
461.50	0.606	0.904	0.128	28.54*	
462.00	0.608	1.208	0.148	24.78*	
462.50	0.638	1.519	0.166	22.74*	
463.00	0.669	1.846	0.182	21.76*	
463.50	0.701	2.189	0.196	21.12*	
464.00	0.733	2.547	0.210	20.67*	
464.50	0.766	2.922	0.223	20.37*	
465.00	0.900	3.338	0.235	21.45*	
465.50	0.828	3.770	0.246	21.23*	
466.00	0.856	4.191	0.257	19.81*	
466.50	0.885	4.626	0.268	19.68*	
467.00	0.914	5.076	0.278	19.59*	
467.50	0.944	5.540	0.287	19.55*	
468.00	0.974	6.020	0.371	15.63*	
468.50	1.005	6.514	0.411	14.56*	
469.00	1.036	7.025	0.444	13.92*	

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
469.50	1.068	7.551	0.472	13.48*	
470.00	1.100	8.093	0.795	8.25*	
470.50	1.128	8.650	0.942	7.15*	
471.00	1.157	9.221	1.059	6.52*	
471.50	1.186	9.807	1.160	6.11*	
472.00	1.216	10.407	1.251	5.81*	
472.50	1.300	11.036	1.334	5.70*	
473.00	1.276	11.680	1.411	5.65	
473.50	1.306	12.325	1.484	5.40	
474.00	1.337	12.986	1.552	5.30	
474.36	1.360	13.479	1.600	4.15	Peak Stage
474.50	1.368	13.662	1.617		
474.53	1.370	13.703	1.621		
474.75	1.384	14.006	1.649		
475.00	1.400	14.354	1.680		
475.33	1.416	14.819	6.607		
475.50	1.425	15.060	7.756		
475.54	1.427	15.117	7.997		
475.75	1.437	15.418	9.138		
475.80	1.440	15.490	9.385		
476.00	1.450	15.779	10.306		
476.25	1.462	16.143	11.339		Spillway #1
476.50	1.475	16.510	12.274		
476.75	1.487	16.880	13.137		
476.95	1.497	17.179	17.112		Spillway #2
477.00	1.500	17.254	19.962		
477.50	1.550	18.016	48.891		
478.00	1.600	18.804	187.682		
478.50	1.650	19.616	341.764		
478.53	1.660	19.666	342.103		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
460.00	0.000	0.000	0.000
460.01	2.00>0.000	0.000	0.000
460.50	0.074	0.000	0.074
461.00	0.105	0.000	0.105
461.50	0.128	0.000	0.128
462.00	0.148	0.000	0.148
462.50	0.166	0.000	0.166
463.00	0.182	0.000	0.182
463.50	0.196	0.000	0.196
464.00	0.210	0.000	0.210
464.50	0.223	0.000	0.223
465.00	0.235	0.000	0.235
465.50	0.246	0.000	0.246
466.00	0.257	0.000	0.257
466.50	0.268	0.000	0.268
467.00	0.278	0.000	0.278
467.50	2.00>0.287	0.000	0.287
468.00	0.371	0.000	0.371
468.50	0.411	0.000	0.411
469.00	0.444	0.000	0.444
469.50	4.00>0.472	0.000	0.472
470.00	0.795	0.000	0.795
470.50	0.942	0.000	0.942
471.00	1.059	0.000	1.059
471.50	1.160	0.000	1.160
472.00	1.251	0.000	1.251
472.50	1.334	0.000	1.334
473.00	1.411	0.000	1.411
473.50	1.484	0.000	1.484
474.00	1.552	0.000	1.552
474.50	1.617	0.000	1.617
474.53	1.621	0.000	1.621
474.75	1.649	0.000	1.649
475.00	18.00>1.680	0.000	1.680
475.33	6.607	0.000	6.607
475.50	7.756	0.000	7.756
475.54	7.997	0.000	7.997
475.75	9.138	0.000	9.138
475.80	9.385	0.000	9.385
476.00	10.306	0.000	10.306

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
476.25	11.339	0.000	11.339
476.50	12.274	0.000	12.274
476.75	13.137	0.000	13.137
476.95	17.112	0.000	17.112
477.00	18.977	0.985	19.962
477.50	38.052	10.838	48.891
478.00	45.024	142.658	187.682
478.50	51.053	290.711	341.764
478.53	51.392	290.711	342.103

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#13	1	0.770	0.120	0.000	0.000	65.000	S	1.73	0.129
	Σ	**0.770**						**1.73**	**0.129**
#12	1	2.960	0.045	0.000	0.000	85.000	M	10.93	0.949
	Σ	**2.960**						**10.93**	**0.949**
#10	1	9.050	0.116	0.000	0.000	79.000	S	29.89	2.452
	Σ	**9.050**						**29.89**	**2.452**
#11	1	0.710	0.023	0.000	0.000	75.000	M	2.14	0.170
	Σ	**0.710**						**2.14**	**0.170**
#9	1	14.140	0.230	0.000	0.000	79.000	S	22.14	2.572
	Σ	**14.140**						**22.14**	**2.572**
#8	1	0.650	0.039	0.000	0.000	84.000	M	2.36	0.202
	Σ	**0.650**						**2.36**	**0.202**
#5	1	12.990	0.335	0.000	0.000	79.000	S	17.18	2.359
	Σ	**12.990**						**17.18**	**2.359**
#3	1	18.180	0.216	0.000	0.000	79.000	S	29.08	3.304
	Σ	**18.180**						**29.08**	**3.304**
#2	1	5.060	0.163	0.000	0.000	83.000	S	9.61	1.037
	Σ	**23.240**						**38.45**	**4.341**
#4	1	5.450	0.164	0.000	0.000	82.000	S	10.10	1.087
	Σ	**41.680**						**64.81**	**7.787**
#6	1	1.530	0.027	0.000	0.000	74.000	M	4.50	0.355
	Σ	**58.710**						**88.50**	**11.085**
#7	1	2.070	0.015	0.000	0.000	66.000	M	4.81	0.360
	Σ	**73.560**						**131.61**	**14.975**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#2	1	3. Short grass pasture	28.00	28.00	100.00	4.230	0.006
		8. Large gullies, diversions, and low flowing streams	0.50	6.00	1,200.00	2.120	0.157

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#2	**1**	**Time of Concentration:**					**0.163**
#3	1	3. Short grass pasture	3.00	4.50	150.00	1.380	0.030
		3. Short grass pasture	3.00	19.85	661.66	1.380	0.133
		3. Short grass pasture	29.00	17.98	62.00	4.300	0.004
		6. Grassed waterway	2.56	10.49	410.00	2.390	0.047
		8. Large gullies, diversions, and low flowing streams	17.08	17.25	100.99	12.390	0.002
#3	**1**	**Time of Concentration:**					**0.216**
#4	1	3. Short grass pasture	28.21	22.00	77.98	4.240	0.005
		6. Grassed waterway	3.00	28.34	944.66	2.590	0.101
		8. Large gullies, diversions, and low flowing streams	0.50	2.25	450.00	2.120	0.058
#4	**1**	**Time of Concentration:**					**0.164**
#5	1	3. Short grass pasture	2.83	4.24	150.00	1.340	0.031
		3. Short grass pasture	3.02	22.77	753.97	1.390	0.150
		3. Short grass pasture	26.47	17.99	67.96	4.110	0.004
		6. Grassed waterway	2.99	41.97	1,403.67	2.590	0.150
		8. Large gullies, diversions, and low flowing streams	8.33	1.99	23.88	8.650	0.000
#5	**1**	**Time of Concentration:**					**0.335**
#6	1	6. Grassed waterway	40.00	80.00	200.00	9.480	0.005
		6. Grassed waterway	20.00	80.00	400.00	6.700	0.016
#6	**1**	**Time of Concentration:**					**0.027**
#7	1	3. Short grass pasture	5.00	5.00	100.00	1.780	0.015
#7	**1**	**Time of Concentration:**					**0.015**
#8	1	8. Large gullies, diversions, and low flowing streams	0.50	1.50	300.00	2.120	0.039
#8	**1**	**Time of Concentration:**					**0.039**
#9	1	3. Short grass pasture	2.83	4.24	150.00	1.340	0.031
		3. Short grass pasture	3.90	11.50	294.87	1.570	0.052
		6. Grassed waterway	3.05	41.93	1,374.75	2.610	0.146
		8. Large gullies, diversions, and low flowing streams	26.83	22.00	81.99	15.530	0.001
#9	**1**	**Time of Concentration:**					**0.230**
#10	1	3. Short grass pasture	33.00	24.75	75.00	4.590	0.004
		6. Grassed waterway	3.00	30.00	1,000.00	2.590	0.107
		8. Large gullies, diversions, and low flowing streams	33.00	115.50	350.00	17.230	0.005
#10	**1**	**Time of Concentration:**					**0.116**
#11	1	3. Short grass pasture	33.00	23.10	70.00	4.590	0.004
		6. Grassed waterway	2.00	3.00	150.00	2.120	0.019
#11	**1**	**Time of Concentration:**					**0.023**
#12	1	3. Short grass pasture	33.00	16.49	49.96	4.590	0.003
		6. Grassed waterway	12.00	96.00	800.00	5.190	0.042

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#12	**1**	**Time of Concentration:**					**0.045**

Bethlehem Landfill Company
Northern Realignment

Post Construction Stormwater Management - Extended Basin #2

Initial Basin El. 460.00

JTF

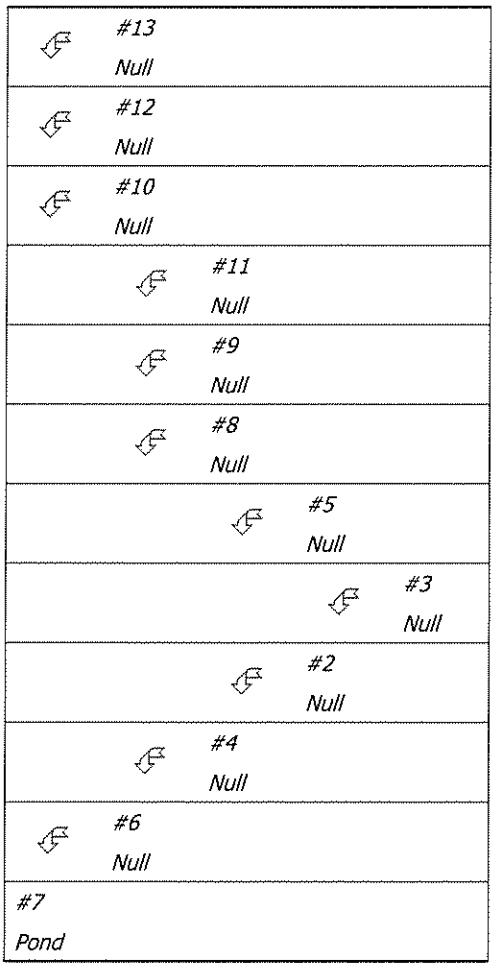
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	100 yr - 24 hr
Rainfall Depth:	7.440 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#2	==>	#4	0.000	0.000	CHANNEL-CC
Null	#3	==>	#2	0.000	0.000	DS-8
Null	#4	==>	#6	0.000	0.000	CHANNEL BB
Null	#5	==>	#4	0.000	0.000	DS-9
Null	#6	==>	#7	0.000	0.000	CHANNEL N
Pond	#7	==>	End	0.000	0.000	BASIN 2
Null	#8	==>	#6	0.000	0.000	CHANNEL AA
Null	#9	==>	#6	0.000	0.000	DS-7
Null	#10	==>	#7	0.000	0.000	DS-6
Null	#11	==>	#6	0.000	0.000	CHANNEL Z
Null	#12	==>	#7	0.000	0.000	CHANNEL M
Null	#13	==>	#7	0.000	0.000	I-19



Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#13		0.770	0.770	2.85	0.22
#12		2.960	2.960	15.50	1.40
#10		9.050	9.050	43.96	3.76
#11		0.710	0.710	3.24	0.27
#9		14.140	14.140	33.70	3.94
#8		0.650	0.650	3.37	0.30
#5		12.990	12.990	26.30	3.62
#3		18.180	18.180	44.22	5.06
#2		5.060	23.240	58.26	6.61
#4		5.450	41.680	98.32	11.86
#6		1.530	58.710	134.55	16.94
#7	In	2.070	73.560	199.97	22.93
	Out			11.62	11.63

Structure Detail:

Structure #13 (Null)

I-19

Structure #12 (Null)

CHANNEL M

Structure #10 (Null)

DS-6

Structure #11 (Null)

CHANNEL Z

Structure #9 (Null)

DS-7

Structure #8 (Null)

CHANNEL AA

Structure #5 (Null)

DS-9

Structure #3 (Null)

DS-8

Structure #2 (Null)

CHANNEL-CC

Structure #4 (Null)

CHANNEL BB

Structure #6 (Null)

CHANNEL N

Structure #7 (Pond)

BASIN 2

Pond Inputs:

Initial Pool Elev:	460.01 ft

Initial Pool:	0.01 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Number of Holes per Elev
36.00	16.25	30.00	100.00	4.50	0.0240	476.25	1

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
476.95	20.00	4.00:1	4.00:1	60.00

Pond Results:

Peak Elevation:	476.33 ft
Dewater Time:	20.77 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
460.00	0.600	0.000	0.000		
460.01	0.600	0.006	0.000		Low hole SPW #1
460.50	0.602	0.300	0.074	48.46*	
461.00	0.604	0.602	0.105	34.90*	
461.50	0.606	0.904	0.128	28.54*	
462.00	0.608	1.208	0.148	24.78*	
462.50	0.638	1.519	0.166	22.74*	
463.00	0.669	1.846	0.182	21.76*	
463.50	0.701	2.189	0.196	21.12*	
464.00	0.733	2.547	0.210	20.67*	
464.50	0.766	2.922	0.223	20.37*	
465.00	0.900	3.338	0.235	21.45*	
465.50	0.828	3.770	0.246	21.23*	
466.00	0.856	4.191	0.257	19.81*	
466.50	0.885	4.626	0.268	19.68*	
467.00	0.914	5.076	0.278	19.59*	
467.50	0.944	5.540	0.287	19.55*	
468.00	0.974	6.020	0.371	15.63*	
468.50	1.005	6.514	0.411	14.56*	
469.00	1.036	7.025	0.444	13.92*	

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
469.50	1.068	7.551	0.472	13.48*	
470.00	1.100	8.093	0.795	8.25*	
470.50	1.128	8.650	0.942	7.15*	
471.00	1.157	9.221	1.059	6.52*	
471.50	1.186	9.807	1.160	6.11*	
472.00	1.216	10.407	1.251	5.81*	
472.50	1.300	11.036	1.334	5.70*	
473.00	1.276	11.680	1.411	5.52*	
473.50	1.306	12.325	1.484	5.40	
474.00	1.337	12.986	1.552	5.25	
474.50	1.368	13.662	1.617	5.20	
474.53	1.370	13.703	1.621	0.30	
474.75	1.384	14.006	1.649	2.25	
475.00	1.400	14.354	1.680	2.55	
475.33	1.416	14.819	6.607	3.85	
475.50	1.425	15.060	7.756	1.15	
475.54	1.427	15.117	7.997	0.25	
475.75	1.437	15.418	9.138	1.10	
475.80	1.440	15.490	9.385	0.30	
476.00	1.450	15.779	10.306	1.00	
476.25	1.462	16.143	11.339	1.65	Spillway #1
476.33	1.466	16.254	11.622	0.90	Peak Stage
476.50	1.475	16.510	12.274		
476.75	1.487	16.880	13.137		
476.95	1.497	17.179	17.112		Spillway #2
477.00	1.500	17.254	19.962		
477.50	1.550	18.016	48.891		
478.00	1.600	18.804	187.682		
478.50	1.650	19.616	341.764		
478.53	1.660	19.666	342.103		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
460.00	0.000	0.000	0.000
460.01	2.00>0.000	0.000	0.000
460.50	0.074	0.000	0.074
461.00	0.105	0.000	0.105
461.50	0.128	0.000	0.128
462.00	0.148	0.000	0.148
462.50	0.166	0.000	0.166
463.00	0.182	0.000	0.182
463.50	0.196	0.000	0.196
464.00	0.210	0.000	0.210
464.50	0.223	0.000	0.223
465.00	0.235	0.000	0.235
465.50	0.246	0.000	0.246
466.00	0.257	0.000	0.257
466.50	0.268	0.000	0.268
467.00	0.278	0.000	0.278
467.50	2.00>0.287	0.000	0.287
468.00	0.371	0.000	0.371
468.50	0.411	0.000	0.411
469.00	0.444	0.000	0.444
469.50	4.00>0.472	0.000	0.472
470.00	0.795	0.000	0.795
470.50	0.942	0.000	0.942
471.00	1.059	0.000	1.059
471.50	1.160	0.000	1.160
472.00	1.251	0.000	1.251
472.50	1.334	0.000	1.334
473.00	1.411	0.000	1.411
473.50	1.484	0.000	1.484
474.00	1.552	0.000	1.552
474.50	1.617	0.000	1.617
474.53	1.621	0.000	1.621
474.75	1.649	0.000	1.649
475.00	18.00>1.680	0.000	1.680
475.33	6.607	0.000	6.607
475.50	7.756	0.000	7.756
475.54	7.997	0.000	7.997
475.75	9.138	0.000	9.138
475.80	9.385	0.000	9.385
476.00	10.306	0.000	10.306

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
476.25	11.339	0.000	11.339
476.50	12.274	0.000	12.274
476.75	13.137	0.000	13.137
476.95	17.112	0.000	17.112
477.00	18.977	0.985	19.962
477.50	38.052	10.838	48.891
478.00	45.024	142.658	187.682
478.50	51.053	290.711	341.764
478.53	51.392	290.711	342.103

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#13	1	0.770	0.120	0.000	0.000	65.000	S	2.85	0.221
	Σ	**0.770**						**2.85**	**0.221**
#12	1	2.960	0.045	0.000	0.000	85.000	M	15.50	1.398
	Σ	**2.960**						**15.50**	**1.398**
#10	1	9.050	0.116	0.000	0.000	79.000	S	43.96	3.759
	Σ	**9.050**						**43.96**	**3.759**
#11	1	0.710	0.023	0.000	0.000	75.000	M	3.24	0.268
	Σ	**0.710**						**3.24**	**0.268**
#9	1	14.140	0.230	0.000	0.000	79.000	S	33.70	3.943
	Σ	**14.140**						**33.70**	**3.943**
#8	1	0.650	0.039	0.000	0.000	84.000	M	3.37	0.300
	Σ	**0.650**						**3.37**	**0.300**
#5	1	12.990	0.335	0.000	0.000	79.000	S	26.30	3.616
	Σ	**12.990**						**26.30**	**3.616**
#3	1	18.180	0.216	0.000	0.000	79.000	S	44.22	5.065
	Σ	**18.180**						**44.22**	**5.065**
#2	1	5.060	0.163	0.000	0.000	83.000	S	14.16	1.548
	Σ	**23.240**						**58.26**	**6.613**
#4	1	5.450	0.164	0.000	0.000	82.000	S	14.98	1.633
	Σ	**41.680**						**98.32**	**11.862**
#6	1	1.530	0.027	0.000	0.000	74.000	M	6.86	0.564
	Σ	**58.710**						**134.55**	**16.937**
#7	1	2.070	0.015	0.000	0.000	66.000	M	7.85	0.612
	Σ	**73.560**						**199.97**	**22.928**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#2	1	3. Short grass pasture	28.00	28.00	100.00	4.230	0.006
		8. Large gullies, diversions, and low flowing streams	0.50	6.00	1,200.00	2.120	0.157

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#2	**1**	**Time of Concentration:**					**0.163**
#3	1	3. Short grass pasture	3.00	4.50	150.00	1.380	0.030
		3. Short grass pasture	3.00	19.85	661.66	1.380	0.133
		3. Short grass pasture	29.00	17.98	62.00	4.300	0.004
		6. Grassed waterway	2.56	10.49	410.00	2.390	0.047
		8. Large gullies, diversions, and low flowing streams	17.08	17.25	100.99	12.390	0.002
#3	**1**	**Time of Concentration:**					**0.216**
#4	1	3. Short grass pasture	28.21	22.00	77.98	4.240	0.005
		6. Grassed waterway	3.00	28.34	944.66	2.590	0.101
		8. Large gullies, diversions, and low flowing streams	0.50	2.25	450.00	2.120	0.058
#4	**1**	**Time of Concentration:**					**0.164**
#5	1	3. Short grass pasture	2.83	4.24	150.00	1.340	0.031
		3. Short grass pasture	3.02	22.77	753.97	1.390	0.150
		3. Short grass pasture	26.47	17.99	67.96	4.110	0.004
		6. Grassed waterway	2.99	41.97	1,403.67	2.590	0.150
		8. Large gullies, diversions, and low flowing streams	8.33	1.99	23.88	8.650	0.000
#5	**1**	**Time of Concentration:**					**0.335**
#6	1	6. Grassed waterway	40.00	80.00	200.00	9.480	0.005
		6. Grassed waterway	20.00	80.00	400.00	6.700	0.016
#6	**1**	**Time of Concentration:**					**0.027**
#7	1	3. Short grass pasture	5.00	5.00	100.00	1.780	0.015
#7	**1**	**Time of Concentration:**					**0.015**
#8	1	8. Large gullies, diversions, and low flowing streams	0.50	1.50	300.00	2.120	0.039
#8	**1**	**Time of Concentration:**					**0.039**
#9	1	3. Short grass pasture	2.83	4.24	150.00	1.340	0.031
		3. Short grass pasture	3.90	11.50	294.87	1.570	0.052
		6. Grassed waterway	3.05	41.93	1,374.75	2.610	0.146
		8. Large gullies, diversions, and low flowing streams	26.83	22.00	81.99	15.530	0.001
#9	**1**	**Time of Concentration:**					**0.230**
#10	1	3. Short grass pasture	33.00	24.75	75.00	4.590	0.004
		6. Grassed waterway	3.00	30.00	1,000.00	2.590	0.107
		8. Large gullies, diversions, and low flowing streams	33.00	115.50	350.00	17.230	0.005
#10	**1**	**Time of Concentration:**					**0.116**
#11	1	3. Short grass pasture	33.00	23.10	70.00	4.590	0.004
		6. Grassed waterway	2.00	3.00	150.00	2.120	0.019
#11	**1**	**Time of Concentration:**					**0.023**
#12	1	3. Short grass pasture	33.00	16.49	49.96	4.590	0.003
		6. Grassed waterway	12.00	96.00	800.00	5.190	0.042

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#12	**1**	**Time of Concentration:**					**0.045**

IESI PA Bethlehem Landfill
Sedimentation Basin 3

Post Development

TAKEN FROM PHASE IV ANALYSIS

JMM

Martin & Martin, Inc.
37 S. Main Street
Suite A
Chambersburg, PA 17201

Phone: 717-264-6759
Email: martinmartin@innernet.net

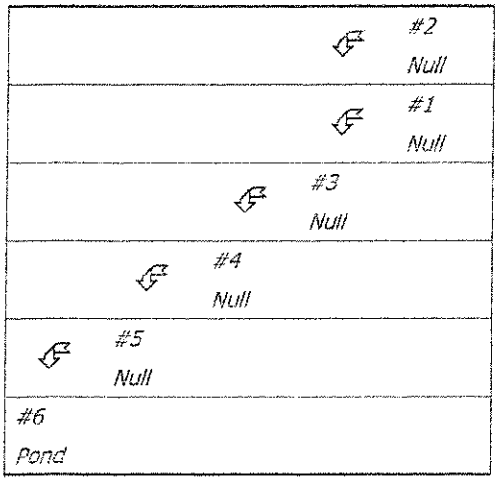
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	2 yr - 24 hr
Rainfall Depth:	3.200 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	#3	0.000	0.000	Channel H
Null	#2	==>	#3	0.000	0.000	Channel G
Null	#3	==>	#4	0.000	0.000	I-6
Null	#4	==>	#5	0.000	0.000	I-7
Null	#5	==>	#6	0.000	0.000	I-8
Pond	#6	==>	End	0.000	0.000	Sed. Basin 3



Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#2		0.250	0.250	0.47	0.04
#1		0.600	0.600	1.13	0.09
#3		0.830	1.680	3.61	0.34
#4		0.400	2.080	4.58	0.43
#5		0.400	2.480	5.56	0.53
#6	In	0.400	2.880	6.31	0.59
	Out			0.59	0.59

Structure Detail:

Structure #2 (Null)

Channel G

Structure #1 (Null)

Channel H

Structure #3 (Null)

I-6

Structure #4 (Null)

I-7

Structure #5 (Null)

I-8

Structure #6 (Pond)

Sed. Basin 3

Pond Inputs:

Initial Pool Elev:	420.01
Initial Pool:	0.00 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev	Number of Holes per Elev
24.00	2.50	18.00	50.00	1.00	0.0150	422.50	6

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
423.50	10.00	2.00:1	2.00:1	20.00

Pond Results:

Peak Elevation:	422.22
H'graph Detention Time:	7.37 hrs
Dewater Time:	1.06 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
420.00	0.100	0.000	0.000		
420.01	0.110	0.001	0.000		Low hole SPW #1
420.50	0.128	0.059	0.110	6.38*	
421.00	0.147	0.128	0.157	6.30	
421.50	0.168	0.206	0.304	5.75	
422.00	0.190	0.296	0.491	4.60	
422.22	0.200	0.341	0.590	2.50	Peak Stage
422.50	0.213	0.396	0.711		Spillway #1
423.00	0.238	0.509	6.886		
423.50	0.264	0.634	14.718		Spillway #2
424.00	0.291	0.773	19.733		
424.50	0.320	0.925	70.471		
425.00	0.350	1.093	129.274		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
420.00	0.000	0.000	0.000
420.01	1.00>0.000	0.000	0.000
420.50	0.110	0.000	0.110
421.00	1.00>0.157	0.000	0.157
421.50	1.00>0.304	0.000	0.304
422.00	1.00>0.491	0.000	0.491
422.50	0.711	0.000	0.711
423.00	6.886	0.000	6.886
423.50	14.718	0.000	14.718
424.00	15.611	4.122	19.733
424.50	16.456	54.016	70.471
425.00	17.259	112.015	129.274

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#2	1	0.250	0.025	0.000	0.000	86.000	TR55	0.47	0.038
	Σ	**0.250**						**0.47**	**0.038**
#1	1	0.600	0.045	0.000	0.000	86.000	TR55	1.13	0.092
	Σ	**0.600**						**1.13**	**0.092**
#3	1	0.830	0.019	0.000	0.000	98.000	TR55	2.02	0.205
	Σ	**1.680**						**3.61**	**0.335**
#4	1	0.400	0.019	0.000	0.000	98.000	TR55	0.97	0.099
	Σ	**2.080**						**4.58**	**0.434**
#5	1	0.400	0.024	0.000	0.000	98.000	TR55	0.97	0.099
	Σ	**2.480**						**5.56**	**0.533**
#6	1	0.400	0.061	0.000	0.000	86.000	TR55	0.75	0.061
	Σ	**2.880**						**6.31**	**0.594**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	33.00	33.00	99.99	4.590	0.006
		6. Grassed waterway	2.00	6.00	300.00	2.120	0.039
#1	**1**	**Time of Concentration:**					**0.045**
#2	1	3. Short grass pasture	33.00	33.00	99.99	4.590	0.006
		6. Grassed waterway	2.00	3.00	150.00	2.120	0.019
#2	**1**	**Time of Concentration:**					**0.025**
#3	1	7. Paved area and small upland gullies	2.00	4.00	200.00	2.840	0.019
#3	**1**	**Time of Concentration:**					**0.019**
#4	1	7. Paved area and small upland gullies	2.00	4.00	200.00	2.840	0.019
#4	**1**	**Time of Concentration:**					**0.019**
#5	1	7. Paved area and small upland gullies	2.00	5.00	250.00	2.840	0.024
#5	**1**	**Time of Concentration:**					**0.024**
#6	1	3. Short grass pasture	2.00	5.00	250.00	1.130	0.061
#6	**1**	**Time of Concentration:**					**0.061**

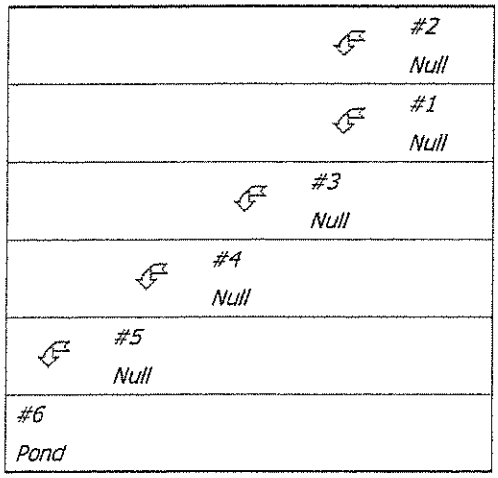
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 24 hr
Rainfall Depth:	4.830 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	#3	0.000	0.000	Channel H
Null	#2	==>	#3	0.000	0.000	Channel G
Null	#3	==>	#4	0.000	0.000	I-6
Null	#4	==>	#5	0.000	0.000	I-7
Null	#5	==>	#6	0.000	0.000	I-8
Pond	#6	==>	End	0.000	0.000	Sed. Basin 3



Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#2		0.250	0.250	0.80	0.07
#1		0.600	0.600	1.92	0.17
#3		0.830	1.680	5.78	0.55
#4		0.400	2.080	7.25	0.71
#5		0.400	2.480	8.72	0.86
#6	In	0.400	2.880	10.00	0.97
	Out			5.19	0.96

Structure Detail:

Structure #2 (Null)

Channel G

Structure #1 (Null)

Channel H

Structure #3 (Null)

I-6

Structure #4 (Null)

I-7

Structure #5 (Null)

I-8

Structure #6 (Pond)

Sed. Basin 3

Pond Inputs:

Initial Pool Elev:	420.01
Initial Pool:	0.00 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev	Number of Holes per Elev
24.00	2.50	18.00	50.00	1.00	0.0150	422.50	6

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
423.50	10.00	2.00:1	2.00:1	20.00

Pond Results:

Peak Elevation:	422.86
H'graph Detention Time:	5.79 hrs
Dewater Time:	1.19 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
420.00	0.100	0.000	0.000		
420.01	0.110	0.001	0.000		Low hole SPW #1
420.50	0.128	0.059	0.110	6.38*	
421.00	0.147	0.128	0.157	6.25	
421.50	0.168	0.206	0.304	4.60	
422.00	0.190	0.296	0.491	5.05	
422.50	0.213	0.396	0.711	4.80	Spillway #1
422.86	0.231	0.478	5.193	1.50	Peak Stage
423.00	0.238	0.509	6.886		
423.50	0.264	0.634	14.718		Spillway #2
424.00	0.291	0.773	19.733		
424.50	0.320	0.925	70.471		
425.00	0.350	1.093	129.274		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
420.00	0.000	0.000	0.000
420.01	1.00>0.000	0.000	0.000
420.50	0.110	0.000	0.110
421.00	1.00>0.157	0.000	0.157
421.50	1.00>0.304	0.000	0.304
422.00	1.00>0.491	0.000	0.491
422.50	0.711	0.000	0.711
423.00	6.886	0.000	6.886
423.50	14.718	0.000	14.718
424.00	15.611	4.122	19.733
424.50	16.456	54.016	70.471
425.00	17.259	112.015	129.274

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#2	1	0.250	0.025	0.000	0.000	86.000	TR55	0.80	0.069
	Σ	**0.250**						**0.80**	**0.069**
#1	1	0.600	0.045	0.000	0.000	86.000	TR55	1.92	0.165
	Σ	**0.600**						**1.92**	**0.165**
#3	1	0.830	0.019	0.000	0.000	98.000	TR55	3.06	0.318
	Σ	**1.680**						**5.78**	**0.552**
#4	1	0.400	0.019	0.000	0.000	98.000	TR55	1.47	0.153
	Σ	**2.080**						**7.25**	**0.705**
#5	1	0.400	0.024	0.000	0.000	98.000	TR55	1.47	0.153
	Σ	**2.480**						**8.72**	**0.858**
#6	1	0.400	0.061	0.000	0.000	86.000	TR55	1.28	0.110
	Σ	**2.880**						**10.00**	**0.969**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	33.00	33.00	99.99	4.590	0.006
		6. Grassed waterway	2.00	6.00	300.00	2.120	0.039
#1	**1**	**Time of Concentration:**					**0.045**
#2	1	3. Short grass pasture	33.00	33.00	99.99	4.590	0.006
		6. Grassed waterway	2.00	3.00	150.00	2.120	0.019
#2	**1**	**Time of Concentration:**					**0.025**
#3	1	7. Paved area and small upland gullies	2.00	4.00	200.00	2.840	0.019
#3	**1**	**Time of Concentration:**					**0.019**
#4	1	7. Paved area and small upland gullies	2.00	4.00	200.00	2.840	0.019
#4	**1**	**Time of Concentration:**					**0.019**
#5	1	7. Paved area and small upland gullies	2.00	5.00	250.00	2.840	0.024
#5	**1**	**Time of Concentration:**					**0.024**
#6	1	3. Short grass pasture	2.00	5.00	250.00	1.130	0.061
#6	**1**	**Time of Concentration:**					**0.061**

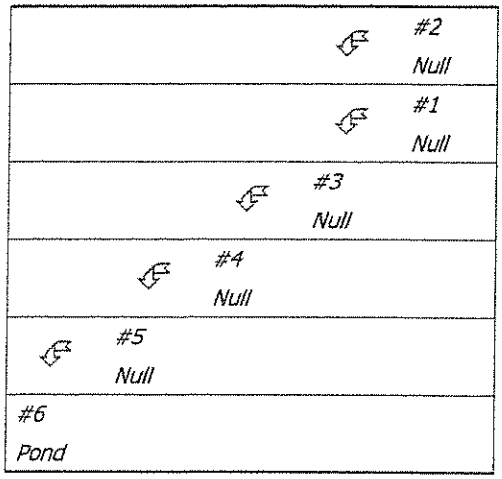
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	25 yr - 24 hr
Rainfall Depth:	5.720 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	#3	0.000	0.000	Channel H
Null	#2	==>	#3	0.000	0.000	Channel G
Null	#3	==>	#4	0.000	0.000	I-6
Null	#4	==>	#5	0.000	0.000	I-7
Null	#5	==>	#6	0.000	0.000	I-8
Pond	#6	==>	End	0.000	0.000	Sed. Basin 3



H-46

Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#2		0.250	0.250	0.98	0.09
#1		0.600	0.600	2.35	0.21
#3		0.830	1.680	6.95	0.67
#4		0.400	2.080	8.70	0.86
#5		0.400	2.480	10.45	1.04
#6	In	0.400	2.880	12.01	1.18
	Out			8.25	1.17

Structure Detail:

Structure #2 (Null)

Channel G

Structure #1 (Null)

Channel H

Structure #3 (Null)

I-6

Structure #4 (Null)

I-7

Structure #5 (Null)

I-8

Structure #6 (Pond)

Sed. Basin 3

Pond Inputs:

Initial Pool Elev:	420.01
Initial Pool:	0.00 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev	Number of Holes per Elev
24.00	2.50	18.00	50.00	1.00	0.0150	422.50	6

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
423.50	10.00	2.00:1	2.00:1	20.00

Pond Results:

Peak Elevation:	423.09
H'graph Detention Time:	5.12 hrs
Dewater Time:	1.22 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
420.00	0.100	0.000	0.000		
420.01	0.110	0.001	0.000		Low hole SPW #1
420.50	0.128	0.059	0.110	6.38*	
421.00	0.147	0.128	0.157	6.25	
421.50	0.168	0.206	0.304	4.30	
422.00	0.190	0.296	0.491	5.20	
422.50	0.213	0.396	0.711	5.25	Spillway #1
423.00	0.238	0.509	6.886	1.85	
423.09	0.243	0.531	8.254	0.05	Peak Stage
423.50	0.264	0.634	14.718		Spillway #2
424.00	0.291	0.773	19.733		
424.50	0.320	0.925	70.471		
425.00	0.350	1.093	129.274		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
420.00	0.000	0.000	0.000
420.01	1.00>0.000	0.000	0.000
420.50	0.110	0.000	0.110
421.00	1.00>0.157	0.000	0.157
421.50	1.00>0.304	0.000	0.304
422.00	1.00>0.491	0.000	0.491
422.50	0.711	0.000	0.711
423.00	6.886	0.000	6.886
423.50	14.718	0.000	14.718
424.00	15.611	4.122	19.733
424.50	16.456	54.016	70.471
425.00	17.259	112.015	129.274

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#2	1	0.250	0.025	0.000	0.000	86.000	TR55	0.98	0.086
	Σ	**0.250**						**0.98**	**0.086**
#1	1	0.600	0.045	0.000	0.000	86.000	TR55	2.35	0.207
	Σ	**0.600**						**2.35**	**0.207**
#3	1	0.830	0.019	0.000	0.000	98.000	TR55	3.63	0.379
	Σ	**1.680**						**6.95**	**0.673**
#4	1	0.400	0.019	0.000	0.000	98.000	TR55	1.75	0.183
	Σ	**2.080**						**8.70**	**0.855**
#5	1	0.400	0.024	0.000	0.000	98.000	TR55	1.75	0.183
	Σ	**2.480**						**10.45**	**1.038**
#6	1	0.400	0.061	0.000	0.000	86.000	TR55	1.57	0.138
	Σ	**2.880**						**12.01**	**1.176**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	33.00	33.00	99.99	4.590	0.006
		6. Grassed waterway	2.00	6.00	300.00	2.120	0.039
#1	**1**	**Time of Concentration:**					**0.045**
#2	1	3. Short grass pasture	33.00	33.00	99.99	4.590	0.006
		6. Grassed waterway	2.00	3.00	150.00	2.120	0.019
#2	**1**	**Time of Concentration:**					**0.025**
#3	1	7. Paved area and small upland gullies	2.00	4.00	200.00	2.840	0.019
#3	**1**	**Time of Concentration:**					**0.019**
#4	1	7. Paved area and small upland gullies	2.00	4.00	200.00	2.840	0.019
#4	**1**	**Time of Concentration:**					**0.019**
#5	1	7. Paved area and small upland gullies	2.00	5.00	250.00	2.840	0.024
#5	**1**	**Time of Concentration:**					**0.024**
#6	1	3. Short grass pasture	2.00	5.00	250.00	1.130	0.061
#6	**1**	**Time of Concentration:**					**0.061**

H-50

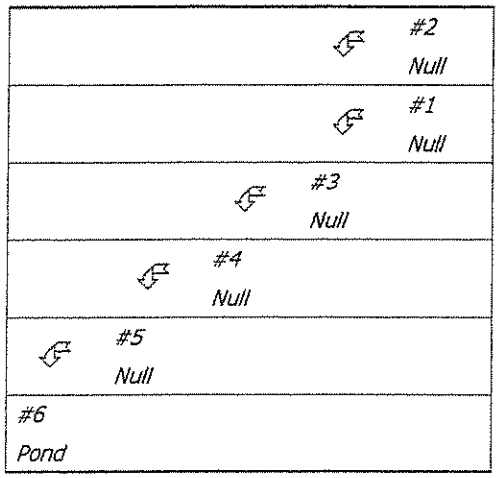
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	50 yr - 24 hr
Rainfall Depth:	6.410 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	#3	0.000	0.000	Channel H
Null	#2	==>	#3	0.000	0.000	Channel G
Null	#3	==>	#4	0.000	0.000	I-6
Null	#4	==>	#5	0.000	0.000	I-7
Null	#5	==>	#6	0.000	0.000	I-8
Pond	#6	==>	End	0.000	0.000	Sed. Basin 3



Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#2		0.250	0.250	1.12	0.10
#1		0.600	0.600	2.68	0.24
#3		0.830	1.680	7.86	0.77
#4		0.400	2.080	9.82	0.97
#5		0.400	2.480	11.78	1.18
#6	In	0.400	2.880	13.57	1.34
	Out			10.43	1.33

Structure Detail:

Structure #2 (Null)

Channel G

Structure #1 (Null)

Channel H

Structure #3 (Null)

I-6

Structure #4 (Null)

I-7

Structure #5 (Null)

I-8

Structure #6 (Pond)

Sed. Basin 3

Pond Inputs:

Initial Pool Elev:	420.01
Initial Pool:	0.00 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev	Number of Holes per Elev
24.00	2.50	18.00	50.00	1.00	0.0150	422.50	6

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
423.50	10.00	2.00:1	2.00:1	20.00

Pond Results:

Peak Elevation:	423.23
H'graph Detention Time:	4.73 hrs
Dewater Time:	1.24 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
420.00	0.100	0.000	0.000		
420.01	0.110	0.001	0.000		Low hole SPW #1
420.50	0.128	0.059	0.110	6.38*	
421.00	0.147	0.128	0.157	6.30	
421.50	0.168	0.206	0.304	4.25	
422.00	0.190	0.296	0.491	5.00	
422.50	0.213	0.396	0.711	5.60	Spillway #1
423.00	0.238	0.509	6.886	2.05	
423.23	0.250	0.565	10.433	0.15	Peak Stage
423.50	0.264	0.634	14.718		Spillway #2
424.00	0.291	0.773	19.733		
424.50	0.320	0.925	70.471		
425.00	0.350	1.093	129.274		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
420.00	0.000	0.000	0.000
420.01	1.00>0.000	0.000	0.000
420.50	0.110	0.000	0.110
421.00	1.00>0.157	0.000	0.157
421.50	1.00>0.304	0.000	0.304
422.00	1.00>0.491	0.000	0.491
422.50	0.711	0.000	0.711
423.00	6.886	0.000	6.886
423.50	14.718	0.000	14.718
424.00	15.611	4.122	19.733
424.50	16.456	54.016	70.471
425.00	17.259	112.015	129.274

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#2	1	0.250	0.025	0.000	0.000	86.000	TR55	1.12	0.100
	Σ	**0.250**						**1.12**	**0.100**
#1	1	0.600	0.045	0.000	0.000	86.000	TR55	2.68	0.240
	Σ	**0.600**						**2.68**	**0.240**
#3	1	0.830	0.019	0.000	0.000	98.000	TR55	4.07	0.427
	Σ	**1.680**						**7.86**	**0.767**
#4	1	0.400	0.019	0.000	0.000	98.000	TR55	1.96	0.206
	Σ	**2.080**						**9.82**	**0.973**
#5	1	0.400	0.024	0.000	0.000	98.000	TR55	1.96	0.206
	Σ	**2.480**						**11.78**	**1.178**
#6	1	0.400	0.061	0.000	0.000	86.000	TR55	1.79	0.160
	Σ	**2.880**						**13.57**	**1.338**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	33.00	33.00	99.99	4.590	0.006
		6. Grassed waterway	2.00	6.00	300.00	2.120	0.039
#1	**1**	**Time of Concentration:**					**0.045**
#2	1	3. Short grass pasture	33.00	33.00	99.99	4.590	0.006
		6. Grassed waterway	2.00	3.00	150.00	2.120	0.019
#2	**1**	**Time of Concentration:**					**0.025**
#3	1	7. Paved area and small upland gullies	2.00	4.00	200.00	2.840	0.019
#3	**1**	**Time of Concentration:**					**0.019**
#4	1	7. Paved area and small upland gullies	2.00	4.00	200.00	2.840	0.019
#4	**1**	**Time of Concentration:**					**0.019**
#5	1	7. Paved area and small upland gullies	2.00	5.00	250.00	2.840	0.024
#5	**1**	**Time of Concentration:**					**0.024**
#6	1	3. Short grass pasture	2.00	5.00	250.00	1.130	0.061
#6	**1**	**Time of Concentration:**					**0.061**

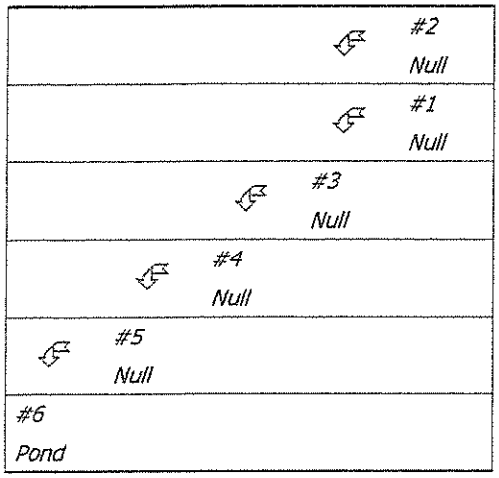
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	100 yr - 24 hr
Rainfall Depth:	7.040 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	#3	0.000	0.000	Channel H
Null	#2	==>	#3	0.000	0.000	Channel G
Null	#3	==>	#4	0.000	0.000	I-6
Null	#4	==>	#5	0.000	0.000	I-7
Null	#5	==>	#6	0.000	0.000	I-8
Pond	#6	==>	End	0.000	0.000	Sed. Basin 3



Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#2		0.250	0.250	1.24	0.11
#1		0.600	0.600	2.98	0.27
#3		0.830	1.680	8.69	0.85
#4		0.400	2.080	10.85	1.08
#5		0.400	2.480	13.00	1.31
#6	In	0.400	2.880	14.99	1.49
	Out			12.18	1.48

Structure Detail:

Structure #2 (Null)

Channel G

Structure #1 (Null)

Channel H

Structure #3 (Null)

I-6

Structure #4 (Null)

I-7

Structure #5 (Null)

I-8

Structure #6 (Pond)

Sed. Basin 3

Pond Inputs:

Initial Pool Elev:	420.01
Initial Pool:	0.00 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev	Number of Holes per Elev
24.00	2.50	18.00	50.00	1.00	0.0150	422.50	6

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
423.50	10.00	2.00:1	2.00:1	20.00

Pond Results:

Peak Elevation:	423.34
H'graph Detention Time:	4.44 hrs
Dewater Time:	1.25 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
420.00	0.100	0.000	0.000		
420.01	0.110	0.001	0.000		Low hole SPW #1
420.50	0.128	0.059	0.110	6.38*	
421.00	0.147	0.128	0.157	6.25	
421.50	0.168	0.206	0.304	4.30	
422.00	0.190	0.296	0.491	4.85	
422.50	0.213	0.396	0.711	5.75	Spillway #1
423.00	0.238	0.509	6.886	2.40	
423.34	0.255	0.593	12.179	0.15	Peak Stage
423.50	0.264	0.634	14.718		Spillway #2
424.00	0.291	0.773	19.733		
424.50	0.320	0.925	70.471		
425.00	0.350	1.093	129.274		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
420.00	0.000	0.000	0.000
420.01	1.00>0.000	0.000	0.000
420.50	0.110	0.000	0.110
421.00	1.00>0.157	0.000	0.157
421.50	1.00>0.304	0.000	0.304
422.00	1.00>0.491	0.000	0.491
422.50	0.711	0.000	0.711
423.00	6.886	0.000	6.886
423.50	14.718	0.000	14.718
424.00	15.611	4.122	19.733
424.50	16.456	54.016	70.471
425.00	17.259	112.015	129.274

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#2	1	0.250	0.025	0.000	0.000	86.000	TR55	1.24	0.113
	Σ	**0.250**						**1.24**	**0.113**
#1	1	0.600	0.045	0.000	0.000	86.000	TR55	2.98	0.270
	Σ	**0.600**						**2.98**	**0.270**
#3	1	0.830	0.019	0.000	0.000	98.000	TR55	4.47	0.470
	Σ	**1.680**						**8.69**	**0.853**
#4	1	0.400	0.019	0.000	0.000	98.000	TR55	2.15	0.227
	Σ	**2.080**						**10.85**	**1.080**
#5	1	0.400	0.024	0.000	0.000	98.000	TR55	2.15	0.227
	Σ	**2.480**						**13.00**	**1.307**
#6	1	0.400	0.061	0.000	0.000	86.000	TR55	1.99	0.180
	Σ	**2.880**						**14.99**	**1.487**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	33.00	33.00	99.99	4.590	0.006
		6. Grassed waterway	2.00	6.00	300.00	2.120	0.039
#1	**1**	**Time of Concentration:**					**0.045**
#2	1	3. Short grass pasture	33.00	33.00	99.99	4.590	0.006
		6. Grassed waterway	2.00	3.00	150.00	2.120	0.019
#2	**1**	**Time of Concentration:**					**0.025**
#3	1	7. Paved area and small upland gullies	2.00	4.00	200.00	2.840	0.019
#3	**1**	**Time of Concentration:**					**0.019**
#4	1	7. Paved area and small upland gullies	2.00	4.00	200.00	2.840	0.019
#4	**1**	**Time of Concentration:**					**0.019**
#5	1	7. Paved area and small upland gullies	2.00	5.00	250.00	2.840	0.024
#5	**1**	**Time of Concentration:**					**0.024**
#6	1	3. Short grass pasture	2.00	5.00	250.00	1.130	0.061
#6	**1**	**Time of Concentration:**					**0.061**

H-62

DETENTION BASIN 4

TAKEN FROM CELL 4F MODIFICATION

IESI PA Bethlehem Landfill
Detention Basin 4

Post Development

JMM

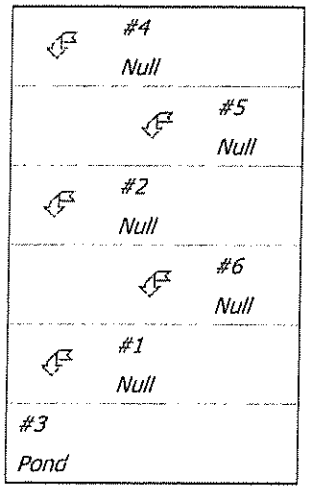
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	2 yr - 24 hr
Rainfall Depth:	3.200 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	#3	0.000	0.000	DS-1
Null	#2	==>	#3	0.000	0.000	Channel A
Pond	#3	==>	End	0.000	0.000	Sed. Basin 4
Null	#4	==>	#3	0.000	0.000	DS-1A
Null	#5	==>	#2	0.000	0.000	DS-2
Null	#6	==>	#1	0.000	0.000	Channel R



Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#4		4.200	4.200	2.12	0.16
#5		12.800	12.800	18.73	1.43
#2		2.200	15.000	21.19	1.61
#6		8.200	8.200	7.91	0.91
#1		25.700	33.900	25.94	3.02
#3	In	3.000	56.100	47.81	4.89
	Out			1.85	4.89

Structure Detail:

Structure #4 (Null)

DS-1A

Structure #5 (Null)

DS-2

Structure #2 (Null)

Channel A

Structure #6 (Null)

Channel R

Structure #1 (Null)

DS-1

Structure #3 (Pond)

Sed. Basin 4

Pond Inputs:

Initial Pool Elev:	429.01
Initial Pool:	0.00 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev	Number of Holes per Elev
48.00	13.50	24.00	134.00	10.45	0.0120	442.50	7

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
443.20	20.00	3.00:1	3.00:1	140.00

Pond Results:

Peak Elevation:	435.02
Dewater Time:	1.22 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
429.00	0.000	0.000	0.000		
429.01	0.001	0.000	0.000		Low hole SPW #1
429.10	0.010	0.000	0.221	0.05	
429.50	0.057	0.012	0.515	0.40	
430.00	0.170	0.067	0.732	1.05	
430.50	0.241	0.169	0.898	1.55	
431.00	0.325	0.310	1.037	1.75	
431.50	0.421	0.496	1.160	2.05	
432.00	0.530	0.734	1.271	2.40	
432.50	0.568	1.008	1.374	2.50	
433.00	0.607	1.302	1.469	2.50	
433.50	0.648	1.616	1.558	2.50	
434.00	0.690	1.950	1.643	2.55	
434.50	0.726	2.304	1.723	2.55	
435.00	0.763	2.677	1.800	6.25	
435.02	0.765	2.693	1.852	1.25	Peak Stage
435.50	0.801	3.068	3.043		
436.00	0.840	3.478	3.599		
436.50	0.879	3.907	4.039		
437.00	0.918	4.357	4.418		
437.50	0.959	4.826	4.759		
438.00	1.000	5.315	5.070		
438.50	1.040	5.825	6.530		
439.00	1.080	6.355	7.288		
439.50	1.121	6.905	7.918		
440.00	1.163	7.476	8.477		
440.20	1.178	7.710	8.687		
440.50	1.204	8.068	8.989		
440.70	1.222	8.310	9.183		
441.00	1.249	8.681	9.464		
441.20	1.267	8.932	9.647		
441.50	1.294	9.316	9.912		
441.70	1.312	9.577	10.084		
441.90	1.331	9.841	10.253		
442.00	1.340	9.975	10.337		
442.20	1.360	10.245	10.501		
442.50	1.391	10.658	10.741		Spillway #1
442.70	1.412	10.938	10.899		
442.75	1.417	11.009	10.937		

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
443.00	1.443	11.366	13.773		
443.20	1.464	11.657	22.816		Spillway #2
443.50	1.496	12.101	120.773		
444.00	1.550	12.863	286.777		

Detailed Discharge Table

Elevation	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
429.00	0.000	0.000	0.000
429.01	2.00>0.000	0.000	0.000
429.10	0.221	0.000	0.221
429.50	0.515	0.000	0.515
430.00	0.732	0.000	0.732
430.50	0.898	0.000	0.898
431.00	1.037	0.000	1.037
431.50	1.160	0.000	1.160
432.00	1.271	0.000	1.271
432.50	1.374	0.000	1.374
433.00	1.469	0.000	1.469
433.50	1.558	0.000	1.558
434.00	1.643	0.000	1.643
434.50	1.723	0.000	1.723
435.00	3.00>1.800	0.000	1.800
435.50	3.043	0.000	3.043
436.00	3.599	0.000	3.599
436.50	4.039	0.000	4.039
437.00	4.418	0.000	4.418
437.50	4.759	0.000	4.759
438.00	3.00>5.070	0.000	5.070
438.50	6.530	0.000	6.530
439.00	7.288	0.000	7.288
439.50	7.918	0.000	7.918
440.00	8.477	0.000	8.477
440.20	8.687	0.000	8.687
440.50	8.989	0.000	8.989
440.70	9.183	0.000	9.183
441.00	9.464	0.000	9.464

Elevation	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
441.20	9.647	0.000	9.647
441.50	9.912	0.000	9.912
441.70	10.084	0.000	10.084
441.90	10.253	0.000	10.253
442.00	10.337	0.000	10.337
442.20	10.501	0.000	10.501
442.50	10.741	0.000	10.741
442.70	10.899	0.000	10.899
442.75	10.937	0.000	10.937
443.00	13.773	0.000	13.773
443.20	22.816	0.000	22.816
443.50	38.956	81.818	120.773
444.00	68.591	218.186	286.777

Subwatershed Hydrology Detail:

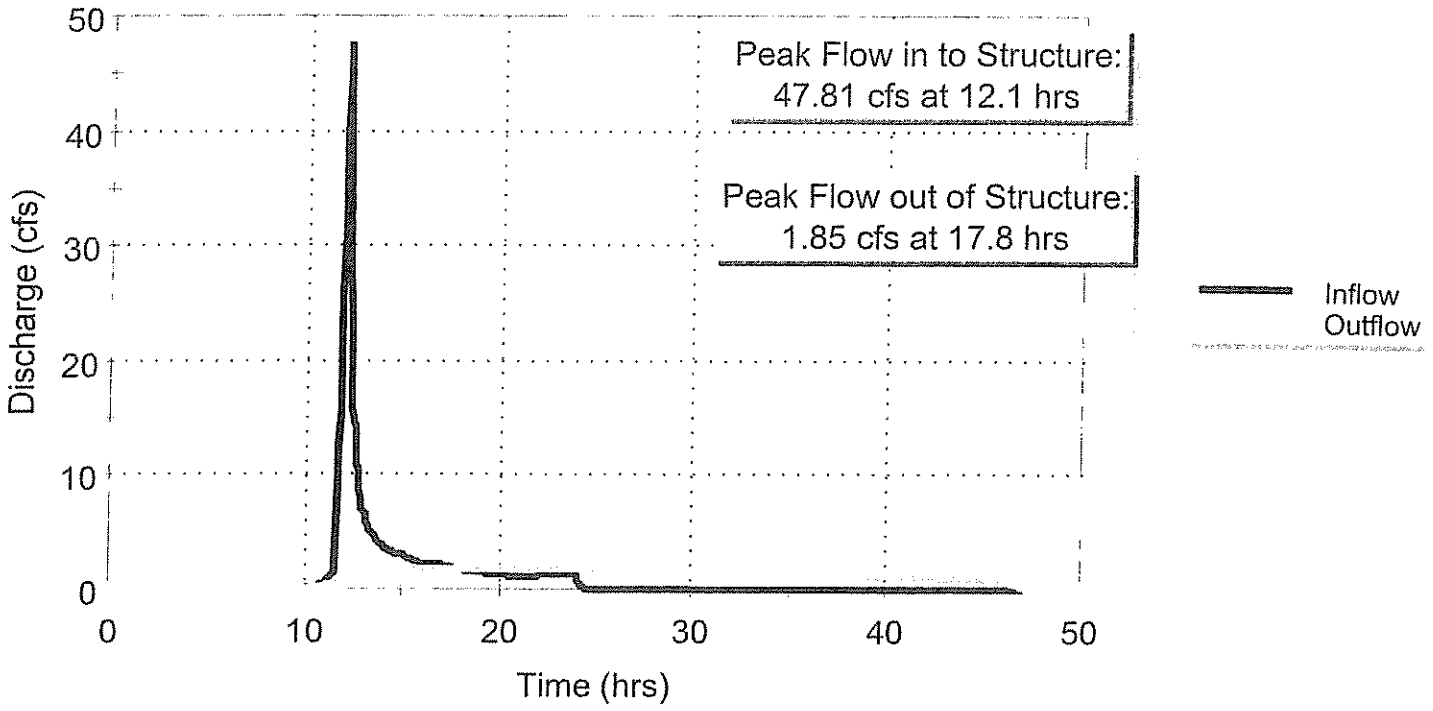
Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#4	1	4.200	0.062	0.000	0.000	61.000	M	2.12	0.155
	Σ	**4.200**						**2.12**	**0.155**
#5	1	12.800	0.100	0.000	0.000	79.000	M	18.73	1.426
	Σ	**12.800**						**18.73**	**1.426**
#2	1	2.200	0.103	0.000	0.000	73.000	M	2.46	0.180
	Σ	**15.000**						**21.19**	**1.606**
#6	1	8.200	0.142	0.000	0.000	79.000	M	7.91	0.913
	Σ	**8.200**						**7.91**	**0.913**
#1	1	25.700	0.130	0.000	0.000	73.000	M	18.02	2.105
	Σ	**33.900**						**25.94**	**3.018**
#3	1	3.000	0.030	0.000	0.000	61.000	F	1.52	0.111
	Σ	**56.100**						**47.81**	**4.891**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	33.00	33.00	99.99	4.590	0.006
		6. Grassed waterway	28.00	224.00	800.00	7.930	0.028
		6. Grassed waterway	3.00	27.00	900.00	2.590	0.096
#1	**1**	**Time of Concentration:**					**0.130**
#2	1	3. Short grass pasture	33.00	23.10	70.00	4.590	0.004
		6. Grassed waterway	5.00	60.00	1,200.00	3.350	0.099
#2	**1**	**Time of Concentration:**					**0.103**
#3	1	3. Short grass pasture	33.00	33.00	100.00	4.590	0.006
		6. Grassed waterway	5.00	15.00	300.00	3.350	0.024
#3	**1**	**Time of Concentration:**					**0.030**
#4	1	3. Short grass pasture	33.00	29.70	90.00	4.590	0.005
		6. Grassed waterway	3.00	15.00	500.00	2.590	0.053
		8. Large gullies, diversions, and low flowing streams	33.00	82.50	250.00	17.230	0.004
#4	**1**	**Time of Concentration:**					**0.062**
#5	1	3. Short grass pasture	33.00	29.70	90.00	4.590	0.005

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
		8. Large gullies, diversions, and low flowing streams	30.00	180.00	600.00	16.430	0.010
		6. Grassed waterway	3.00	24.00	800.00	2.590	0.085
#5	**1**	**Time of Concentration:**					**0.100**
#6	1	3. Short grass pasture	5.00	15.00	300.00	1.780	0.046
		6. Grassed waterway	3.00	27.00	900.00	2.590	0.096
#6	**1**	**Time of Concentration:**					**0.142**

Inflow/Outflow Hydrographs for Structure # 3



IESI PA Bethlehem Landfill
Detention Basin 4

Post Development

JMM

H-75

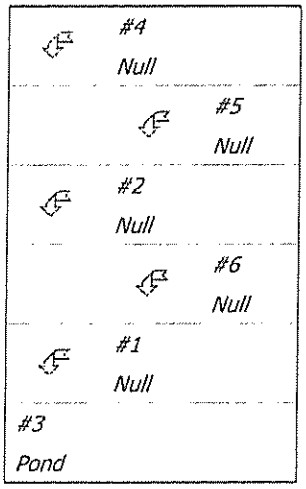
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 24 hr
Rainfall Depth:	4.830 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	#3	0.000	0.000	DS-1
Null	#2	==>	#3	0.000	0.000	Channel A
Pond	#3	==>	End	0.000	0.000	Sed. Basin 4
Null	#4	==>	#3	0.000	0.000	DS-1A
Null	#5	==>	#2	0.000	0.000	DS-2
Null	#6	==>	#1	0.000	0.000	Channel R



Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#4		4.200	4.200	6.15	0.44
#5		12.800	12.800	35.15	2.83
#2		2.200	15.000	40.27	3.23
#6		8.200	8.200	15.53	1.81
#1		25.700	33.900	55.29	6.42
#3	In	3.000	56.100	102.35	10.40
	Out			5.54	10.13

Structure Detail:

Structure #4 (Null)

DS-1A

Structure #5 (Null)

DS-2

Structure #2 (Null)

Channel A

Structure #6 (Null)

Channel R

Structure #1 (Null)

DS-1

Structure #3 (Pond)

Sed. Basin 4

Pond Inputs:

Initial Pool Elev:	429.01
Initial Pool:	0.00 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev	Number of Holes per Elev
48.00	13.50	24.00	134.00	10.45	0.0120	442.50	7

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
443.20	20.00	3.00:1	3.00:1	140.00

Pond Results:

Peak Elevation:	438.16
Dewater Time:	1.60 days

Dewatering time is calculated from peak stage to lowest spillway

H-79

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
429.00	0.000	0.000	0.000		
429.01	0.001	0.000	0.000		Low hole SPW #1
429.10	0.010	0.000	0.221	0.02*	
429.50	0.057	0.012	0.515	0.28*	
430.00	0.170	0.067	0.732	0.90*	
430.50	0.241	0.169	0.898	1.38*	
431.00	0.325	0.310	1.037	1.65*	
431.50	0.421	0.496	1.160	2.05	
432.00	0.530	0.734	1.271	2.35	
432.50	0.568	1.008	1.374	2.50	
433.00	0.607	1.302	1.469	2.50	
433.50	0.648	1.616	1.558	2.50	
434.00	0.690	1.950	1.643	2.55	
434.50	0.726	2.304	1.723	2.55	
435.00	0.763	2.677	1.800	2.55	
435.50	0.801	3.068	3.043	2.00	
436.00	0.840	3.478	3.599	1.50	
436.50	0.879	3.907	4.039	1.35	
437.00	0.918	4.357	4.418	2.05	
437.50	0.959	4.826	4.759	2.45	
438.00	1.000	5.315	5.070	3.00	
438.16	1.012	5.478	5.536	2.15	Peak Stage
438.50	1.040	5.825	6.530		
439.00	1.080	6.355	7.288		
439.50	1.121	6.905	7.918		
440.00	1.163	7.476	8.477		
440.20	1.178	7.710	8.687		
440.50	1.204	8.068	8.989		
440.70	1.222	8.310	9.183		
441.00	1.249	8.681	9.464		
441.20	1.267	8.932	9.647		
441.50	1.294	9.316	9.912		
441.70	1.312	9.577	10.084		
441.90	1.331	9.841	10.253		
442.00	1.340	9.975	10.337		
442.20	1.360	10.245	10.501		
442.50	1.391	10.658	10.741		Spillway #1
442.70	1.412	10.938	10.899		
442.75	1.417	11.009	10.937		

H-80

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
443.00	1.443	11.366	13.773		
443.20	1.464	11.657	22.816		Spillway #2
443.50	1.496	12.101	120.773		
444.00	1.550	12.863	286.777		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
429.00	0.000	0.000	0.000
429.01	2.00>0.000	0.000	0.000
429.10	0.221	0.000	0.221
429.50	0.515	0.000	0.515
430.00	0.732	0.000	0.732
430.50	0.898	0.000	0.898
431.00	1.037	0.000	1.037
431.50	1.160	0.000	1.160
432.00	1.271	0.000	1.271
432.50	1.374	0.000	1.374
433.00	1.469	0.000	1.469
433.50	1.558	0.000	1.558
434.00	1.643	0.000	1.643
434.50	1.723	0.000	1.723
435.00	3.00>1.800	0.000	1.800
435.50	3.043	0.000	3.043
436.00	3.599	0.000	3.599
436.50	4.039	0.000	4.039
437.00	4.418	0.000	4.418
437.50	4.759	0.000	4.759
438.00	3.00>5.070	0.000	5.070
438.50	6.530	0.000	6.530
439.00	7.288	0.000	7.288
439.50	7.918	0.000	7.918
440.00	8.477	0.000	8.477
440.20	8.687	0.000	8.687
440.50	8.989	0.000	8.989
440.70	9.183	0.000	9.183

Elevation	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
441.00	9.464	0.000	9.464
441.20	9.647	0.000	9.647
441.50	9.912	0.000	9.912
441.70	10.084	0.000	10.084
441.90	10.253	0.000	10.253
442.00	10.337	0.000	10.337
442.20	10.501	0.000	10.501
442.50	10.741	0.000	10.741
442.70	10.899	0.000	10.899
442.75	10.937	0.000	10.937
443.00	13.773	0.000	13.773
443.20	22.816	0.000	22.816
443.50	38.956	81.818	120.773
444.00	68.591	218.186	286.777

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#4	1	4.200	0.062	0.000	0.000	61.000	M	6.15	0.444
	Σ	**4.200**						**6.15**	**0.444**
#5	1	12.800	0.100	0.000	0.000	79.000	M	35.15	2.833
	Σ	**12.800**						**35.15**	**2.833**
#2	1	2.200	0.103	0.000	0.000	73.000	M	5.12	0.394
	Σ	**15.000**						**40.27**	**3.227**
#6	1	8.200	0.142	0.000	0.000	79.000	M	15.53	1.815
	Σ	**8.200**						**15.53**	**1.815**
#1	1	25.700	0.130	0.000	0.000	73.000	M	39.80	4.600
	Σ	**33.900**						**55.29**	**6.415**
#3	1	3.000	0.030	0.000	0.000	61.000	F	4.39	0.317
	Σ	**56.100**						**102.35**	**10.403**

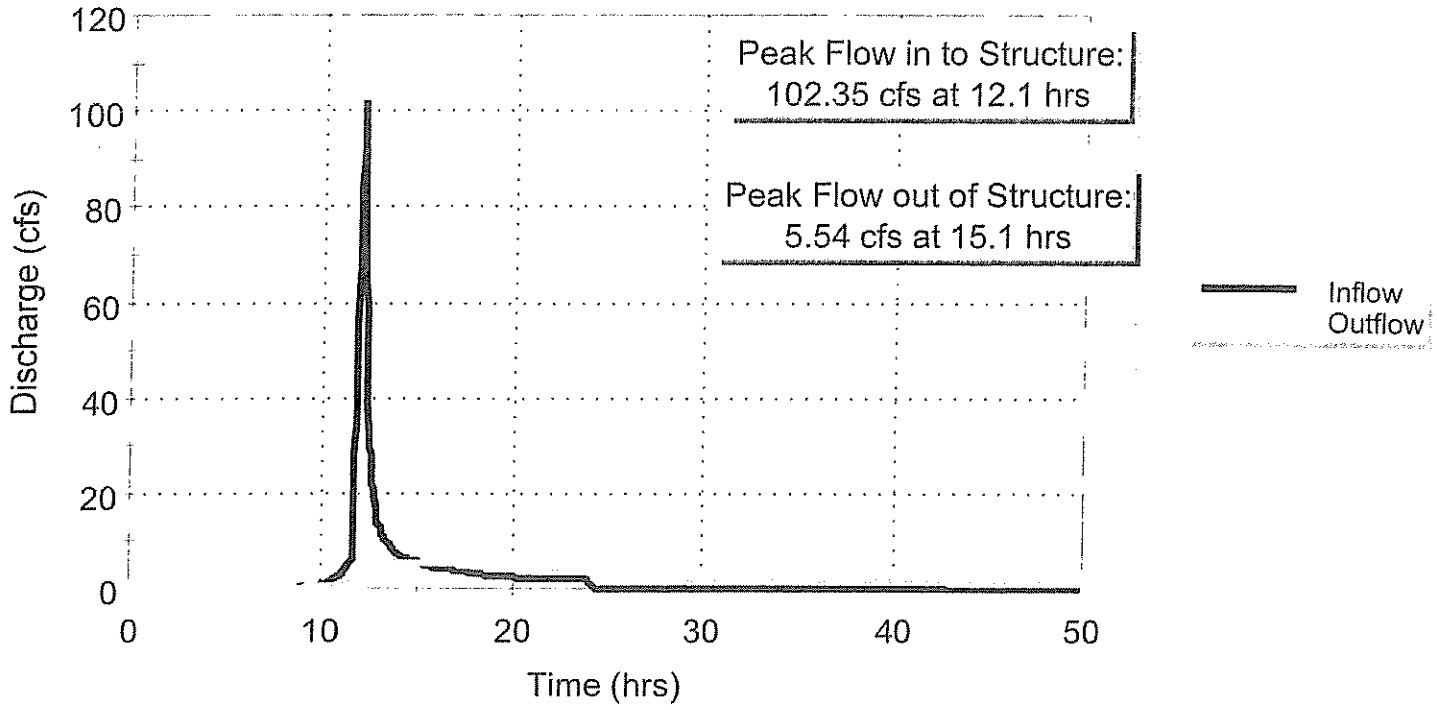
Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	33.00	33.00	99.99	4.590	0.006
		6. Grassed waterway	28.00	224.00	800.00	7.930	0.028
		6. Grassed waterway	3.00	27.00	900.00	2.590	0.096
#1	**1**	**Time of Concentration:**					**0.130**
#2	1	3. Short grass pasture	33.00	23.10	70.00	4.590	0.004
		6. Grassed waterway	5.00	60.00	1,200.00	3.350	0.099
#2	**1**	**Time of Concentration:**					**0.103**
#3	1	3. Short grass pasture	33.00	33.00	100.00	4.590	0.006
		6. Grassed waterway	5.00	15.00	300.00	3.350	0.024
#3	**1**	**Time of Concentration:**					**0.030**
#4	1	3. Short grass pasture	33.00	29.70	90.00	4.590	0.005
		6. Grassed waterway	3.00	15.00	500.00	2.590	0.053
		8. Large gullies, diversions, and low flowing streams	33.00	82.50	250.00	17.230	0.004
#4	**1**	**Time of Concentration:**					**0.062**
#5	1	3. Short grass pasture	33.00	29.70	90.00	4.590	0.005

H-83

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
		8. Large gullies, diversions, and low flowing streams	30.00	180.00	600.00	16.430	0.010
		6. Grassed waterway	3.00	24.00	800.00	2.590	0.085
#5	**1**	**Time of Concentration:**					**0.100**
#6	1	3. Short grass pasture	5.00	15.00	300.00	1.780	0.046
		6. Grassed waterway	3.00	27.00	900.00	2.590	0.096
#6	**1**	**Time of Concentration:**					**0.142**

Inflow/Outflow Hydrographs for Structure # 3



IESI PA Bethlehem Landfill

Detention Basin 4

Post Development

JMM

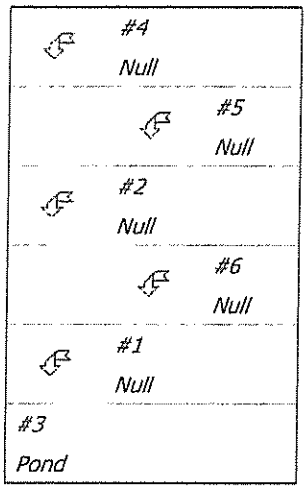
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	25 yr - 24 hr
Rainfall Depth:	5.720 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	#3	0.000	0.000	DS-1
Null	#2	==>	#3	0.000	0.000	Channel A
Pond	#3	==>	End	0.000	0.000	Sed. Basin 4
Null	#4	==>	#3	0.000	0.000	DS-1A
Null	#5	==>	#2	0.000	0.000	DS-2
Null	#6	==>	#1	0.000	0.000	Channel R



Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#4		4.200	4.200	8.68	0.64
#5		12.800	12.800	44.34	3.66
#2		2.200	15.000	50.99	4.18
#6		8.200	8.200	19.94	2.34
#1		25.700	33.900	72.48	8.46
#3	In	3.000	56.100	134.37	13.74
	Out			8.15	13.23

Structure Detail:

Structure #4 (Null)

DS-1A

Structure #5 (Null)

DS-2

Structure #2 (Null)

Channel A

Structure #6 (Null)

Channel R

Structure #1 (Null)

DS-1

Structure #3 (Pond)

Sed. Basin 4

Pond Inputs:

Initial Pool Elev:	429.01
Initial Pool:	0.00 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev	Number of Holes per Elev
48.00	13.50	24.00	134.00	10.45	0.0120	442.50	7

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
443.20	20.00	3.00:1	3.00:1	140.00

Pond Results:

Peak Elevation:	439.71
Dewater Time:	1.72 days

Dewatering time is calculated from peak stage to lowest spillway

H-90

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
429.00	0.000	0.000	0.000		
429.01	0.001	0.000	0.000		Low hole SPW #1
429.10	0.010	0.000	0.221	0.02*	
429.50	0.057	0.012	0.515	0.28*	
430.00	0.170	0.067	0.732	0.90*	
430.50	0.241	0.169	0.898	1.38*	
431.00	0.325	0.310	1.037	1.65*	
431.50	0.421	0.496	1.160	1.94*	
432.00	0.530	0.734	1.271	2.35	
432.50	0.568	1.008	1.374	2.50	
433.00	0.607	1.302	1.469	2.55	
433.50	0.648	1.616	1.558	2.50	
434.00	0.690	1.950	1.643	2.50	
434.50	0.726	2.304	1.723	2.55	
435.00	0.763	2.677	1.800	2.55	
435.50	0.801	3.068	3.043	2.00	
436.00	0.840	3.478	3.599	1.50	
436.50	0.879	3.907	4.039	1.40	
437.00	0.918	4.357	4.418	1.25	
437.50	0.959	4.826	4.759	1.25	
438.00	1.000	5.315	5.070	2.20	
438.50	1.040	5.825	6.530	2.10	
439.00	1.080	6.355	7.288	1.85	
439.50	1.121	6.905	7.918	2.20	
439.71	1.139	7.144	8.151	1.90	Peak Stage
440.00	1.163	7.476	8.477		
440.20	1.178	7.710	8.687		
440.50	1.204	8.068	8.989		
440.70	1.222	8.310	9.183		
441.00	1.249	8.681	9.464		
441.20	1.267	8.932	9.647		
441.50	1.294	9.316	9.912		
441.70	1.312	9.577	10.084		
441.90	1.331	9.841	10.253		
442.00	1.340	9.975	10.337		
442.20	1.360	10.245	10.501		
442.50	1.391	10.658	10.741		Spillway #1
442.70	1.412	10.938	10.899		
442.75	1.417	11.009	10.937		

H-91

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
443.00	1.443	11.366	13.773		
443.20	1.464	11.657	22.816		Spillway #2
443.50	1.496	12.101	120.773		
444.00	1.550	12.863	286.777		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
429.00	0.000	0.000	0.000
429.01	2.00>0.000	0.000	0.000
429.10	0.221	0.000	0.221
429.50	0.515	0.000	0.515
430.00	0.732	0.000	0.732
430.50	0.898	0.000	0.898
431.00	1.037	0.000	1.037
431.50	1.160	0.000	1.160
432.00	1.271	0.000	1.271
432.50	1.374	0.000	1.374
433.00	1.469	0.000	1.469
433.50	1.558	0.000	1.558
434.00	1.643	0.000	1.643
434.50	1.723	0.000	1.723
435.00	3.00>1.800	0.000	1.800
435.50	3.043	0.000	3.043
436.00	3.599	0.000	3.599
436.50	4.039	0.000	4.039
437.00	4.418	0.000	4.418
437.50	4.759	0.000	4.759
438.00	3.00>5.070	0.000	5.070
438.50	6.530	0.000	6.530
439.00	7.288	0.000	7.288
439.50	7.918	0.000	7.918
440.00	8.477	0.000	8.477
440.20	8.687	0.000	8.687
440.50	8.989	0.000	8.989
440.70	9.183	0.000	9.183

Elevation	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
441.00	9.464	0.000	9.464
441.20	9.647	0.000	9.647
441.50	9.912	0.000	9.912
441.70	10.084	0.000	10.084
441.90	10.253	0.000	10.253
442.00	10.337	0.000	10.337
442.20	10.501	0.000	10.501
442.50	10.741	0.000	10.741
442.70	10.899	0.000	10.899
442.75	10.937	0.000	10.937
443.00	13.773	0.000	13.773
443.20	22.816	0.000	22.816
443.50	38.956	81.818	120.773
444.00	68.591	218.186	286.777

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#4	1	4.200	0.062	0.000	0.000	61.000	M	8.68	0.637
	Σ	**4.200**						**8.68**	**0.637**
#5	1	12.800	0.100	0.000	0.000	79.000	M	44.34	3.659
	Σ	**12.800**						**44.34**	**3.659**
#2	1	2.200	0.103	0.000	0.000	73.000	M	6.65	0.524
	Σ	**15.000**						**50.99**	**4.183**
#6	1	8.200	0.142	0.000	0.000	79.000	M	19.94	2.344
	Σ	**8.200**						**19.94**	**2.344**
#1	1	25.700	0.130	0.000	0.000	73.000	M	52.66	6.121
	Σ	**33.900**						**72.48**	**8.465**
#3	1	3.000	0.030	0.000	0.000	61.000	F	6.20	0.455
	Σ	**56.100**						**134.37**	**13.741**

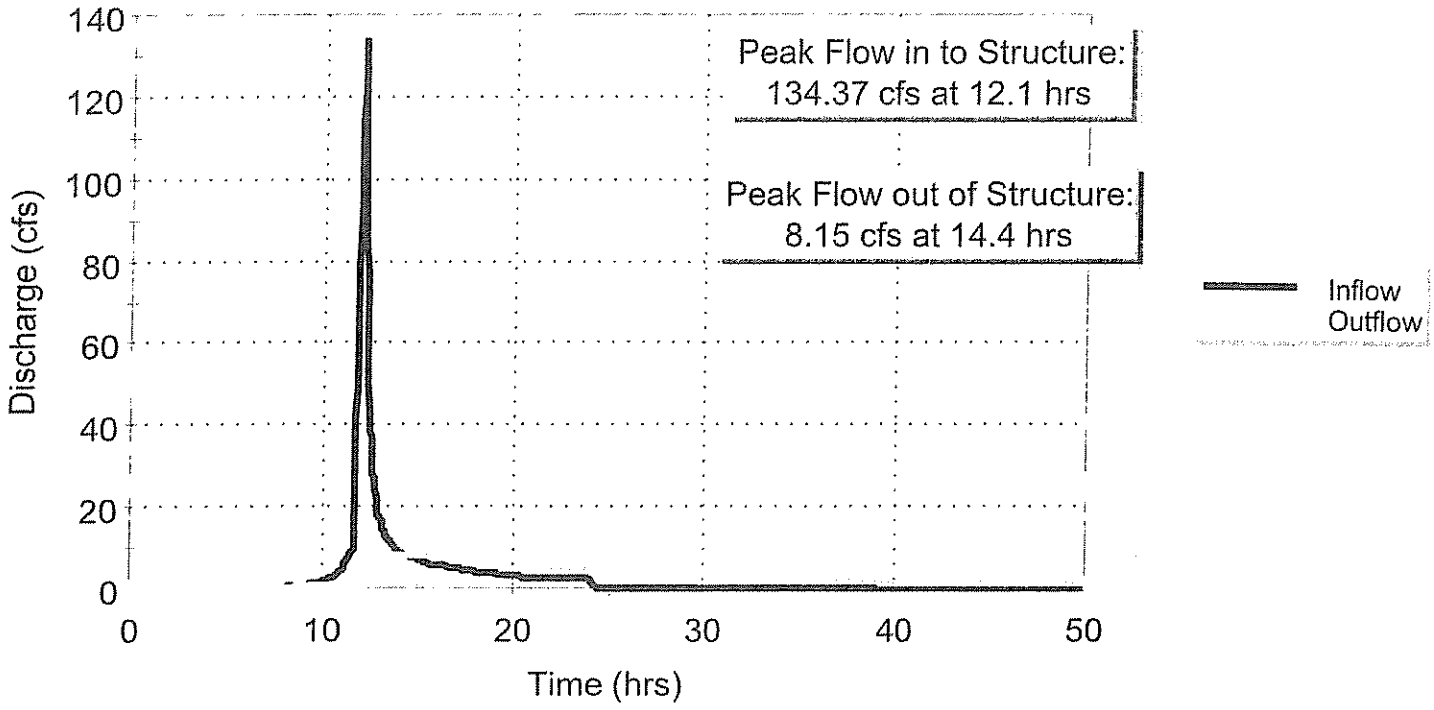
Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	33.00	33.00	99.99	4.590	0.006
		6. Grassed waterway	28.00	224.00	800.00	7.930	0.028
		6. Grassed waterway	3.00	27.00	900.00	2.590	0.096
#1	**1**	**Time of Concentration:**					**0.130**
#2	1	3. Short grass pasture	33.00	23.10	70.00	4.590	0.004
		6. Grassed waterway	5.00	60.00	1,200.00	3.350	0.099
#2	**1**	**Time of Concentration:**					**0.103**
#3	1	3. Short grass pasture	33.00	33.00	100.00	4.590	0.006
		6. Grassed waterway	5.00	15.00	300.00	3.350	0.024
#3	**1**	**Time of Concentration:**					**0.030**
#4	1	3. Short grass pasture	33.00	29.70	90.00	4.590	0.005
		6. Grassed waterway	3.00	15.00	500.00	2.590	0.053
		8. Large gullies, diversions, and low flowing streams	33.00	82.50	250.00	17.230	0.004
#4	**1**	**Time of Concentration:**					**0.062**
#5	1	3. Short grass pasture	33.00	29.70	90.00	4.590	0.005

H-94

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
		8. Large gullies, diversions, and low flowing streams	30.00	180.00	600.00	16.430	0.010
		6. Grassed waterway	3.00	24.00	800.00	2.590	0.085
#5	**1**	**Time of Concentration:**					**0.100**
#6	1	3. Short grass pasture	5.00	15.00	300.00	1.780	0.046
		6. Grassed waterway	3.00	27.00	900.00	2.590	0.096
#6	**1**	**Time of Concentration:**					**0.142**

Inflow/Outflow Hydrographs for Structure # 3



H-910

IESI PA Bethlehem Landfill
Detention Basin 4

Post Development

JMM

H-97

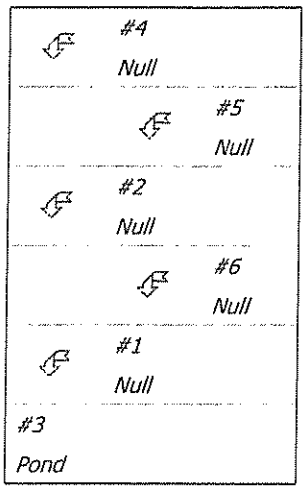
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	100 yr - 24 hr
Rainfall Depth:	7.070 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	#3	0.000	0.000	DS-1
Null	#2	==>	#3	0.000	0.000	Channel A
Pond	#3	==>	End	0.000	0.000	Sed. Basin 4
Null	#4	==>	#3	0.000	0.000	DS-1A
Null	#5	==>	#2	0.000	0.000	DS-2
Null	#6	==>	#1	0.000	0.000	Channel R



Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#4		4.200	4.200	12.80	0.96
#5		12.800	12.800	58.34	4.96
#2		2.200	15.000	67.36	5.69
#6		8.200	8.200	26.72	3.18
#1		25.700	33.900	99.85	11.73
#3	In	3.000	56.100	184.43	19.08
	Out			10.49	18.16

H-100

Structure Detail:

Structure #4 (Null)

DS-1A

Structure #5 (Null)

DS-2

Structure #2 (Null)

Channel A

Structure #6 (Null)

Channel R

Structure #1 (Null)

DS-1

Structure #3 (Pond)

Sed. Basin 4

Pond Inputs:

Initial Pool Elev:	429.01
Initial Pool:	0.00 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev	Number of Holes per Elev
36.00	13.50	24.00	134.00	10.45	0.0120	442.50	7

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
443.20	20.00	3.00:1	3.00:1	140.00

Pond Results:

Peak Elevation:	442.19
Dewater Time:	1.85 days

Dewatering time is calculated from peak stage to lowest spillway

H-101

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
429.00	0.000	0.000	0.000		
429.01	0.001	0.000	0.000		Low hole SPW #1
429.10	0.010	0.000	0.221	0.02*	
429.50	0.057	0.012	0.515	0.28*	
430.00	0.170	0.067	0.732	0.90*	
430.50	0.241	0.169	0.898	1.38*	
431.00	0.325	0.310	1.037	1.65*	
431.50	0.421	0.496	1.160	1.94*	
432.00	0.530	0.734	1.271	2.26*	
432.50	0.568	1.008	1.374	2.42*	
433.00	0.607	1.302	1.469	2.50	
433.50	0.648	1.616	1.558	2.50	
434.00	0.690	1.950	1.643	2.55	
434.50	0.726	2.304	1.723	2.55	
435.00	0.763	2.677	1.800	2.55	
435.50	0.801	3.068	3.043	2.00	
436.00	0.840	3.478	3.599	1.50	
436.50	0.879	3.907	4.039	1.35	
437.00	0.918	4.357	4.418	1.30	
437.50	0.959	4.826	4.759	1.25	
438.00	1.000	5.315	5.070	1.20	
438.50	1.040	5.825	6.530	1.05	
439.00	1.080	6.355	7.288	0.95	
439.50	1.121	6.905	7.918	0.95	
440.00	1.163	7.476	8.477	1.50	
440.20	1.178	7.710	8.687	0.60	
440.50	1.204	8.068	8.989	0.80	
440.70	1.222	8.310	9.183	0.55	
441.00	1.249	8.681	9.464	0.85	
441.20	1.267	8.932	9.647	0.55	
441.50	1.294	9.316	9.912	0.95	
441.70	1.312	9.577	10.084	0.70	
441.90	1.331	9.841	10.253	0.85	
442.00	1.340	9.975	10.337	0.50	
442.19	1.359	10.226	10.489	1.60	Peak Stage
442.20	1.360	10.245	10.501		
442.50	1.391	10.658	10.741		Spillway #1
442.70	1.412	10.938	10.899		
442.75	1.417	11.009	10.937		

H-102

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
443.00	1.443	11.366	11.129		
443.20	1.464	11.657	17.112		Spillway #2
443.50	1.496	12.101	111.034		
444.00	1.550	12.863	259.870		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
429.00	0.000	0.000	0.000
429.01	2.00>0.000	0.000	0.000
429.10	0.221	0.000	0.221
429.50	0.515	0.000	0.515
430.00	0.732	0.000	0.732
430.50	0.898	0.000	0.898
431.00	1.037	0.000	1.037
431.50	1.160	0.000	1.160
432.00	1.271	0.000	1.271
432.50	1.374	0.000	1.374
433.00	1.469	0.000	1.469
433.50	1.558	0.000	1.558
434.00	1.643	0.000	1.643
434.50	1.723	0.000	1.723
435.00	3.00>1.800	0.000	1.800
435.50	3.043	0.000	3.043
436.00	3.599	0.000	3.599
436.50	4.039	0.000	4.039
437.00	4.418	0.000	4.418
437.50	4.759	0.000	4.759
438.00	3.00>5.070	0.000	5.070
438.50	6.530	0.000	6.530
439.00	7.288	0.000	7.288
439.50	7.918	0.000	7.918
440.00	8.477	0.000	8.477
440.20	8.687	0.000	8.687
440.50	8.989	0.000	8.989
440.70	9.183	0.000	9.183

H-103

Elevation	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
441.00	9.464	0.000	9.464
441.20	9.647	0.000	9.647
441.50	9.912	0.000	9.912
441.70	10.084	0.000	10.084
441.90	10.253	0.000	10.253
442.00	10.337	0.000	10.337
442.20	10.501	0.000	10.501
442.50	10.741	0.000	10.741
442.70	10.899	0.000	10.899
442.75	10.937	0.000	10.937
443.00	11.129	0.000	11.129
443.20	17.112	0.000	17.112
443.50	29.217	81.818	111.034
444.00	41.684	218.186	259.870

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#4	1	4.200	0.062	0.000	0.000	61.000	M	12.80	0.963
	Σ	**4.200**						**12.80**	**0.963**
#5	1	12.800	0.100	0.000	0.000	79.000	M	58.34	4.958
	Σ	**12.800**						**58.34**	**4.958**
#2	1	2.200	0.103	0.000	0.000	73.000	M	9.03	0.733
	Σ	**15.000**						**67.36**	**5.691**
#6	1	8.200	0.142	0.000	0.000	79.000	M	26.72	3.176
	Σ	**8.200**						**26.72**	**3.176**
#1	1	25.700	0.130	0.000	0.000	73.000	M	73.12	8.557
	Σ	**33.900**						**99.85**	**11.734**
#3	1	3.000	0.030	0.000	0.000	61.000	F	9.14	0.688
	Σ	**56.100**						**184.43**	**19.076**

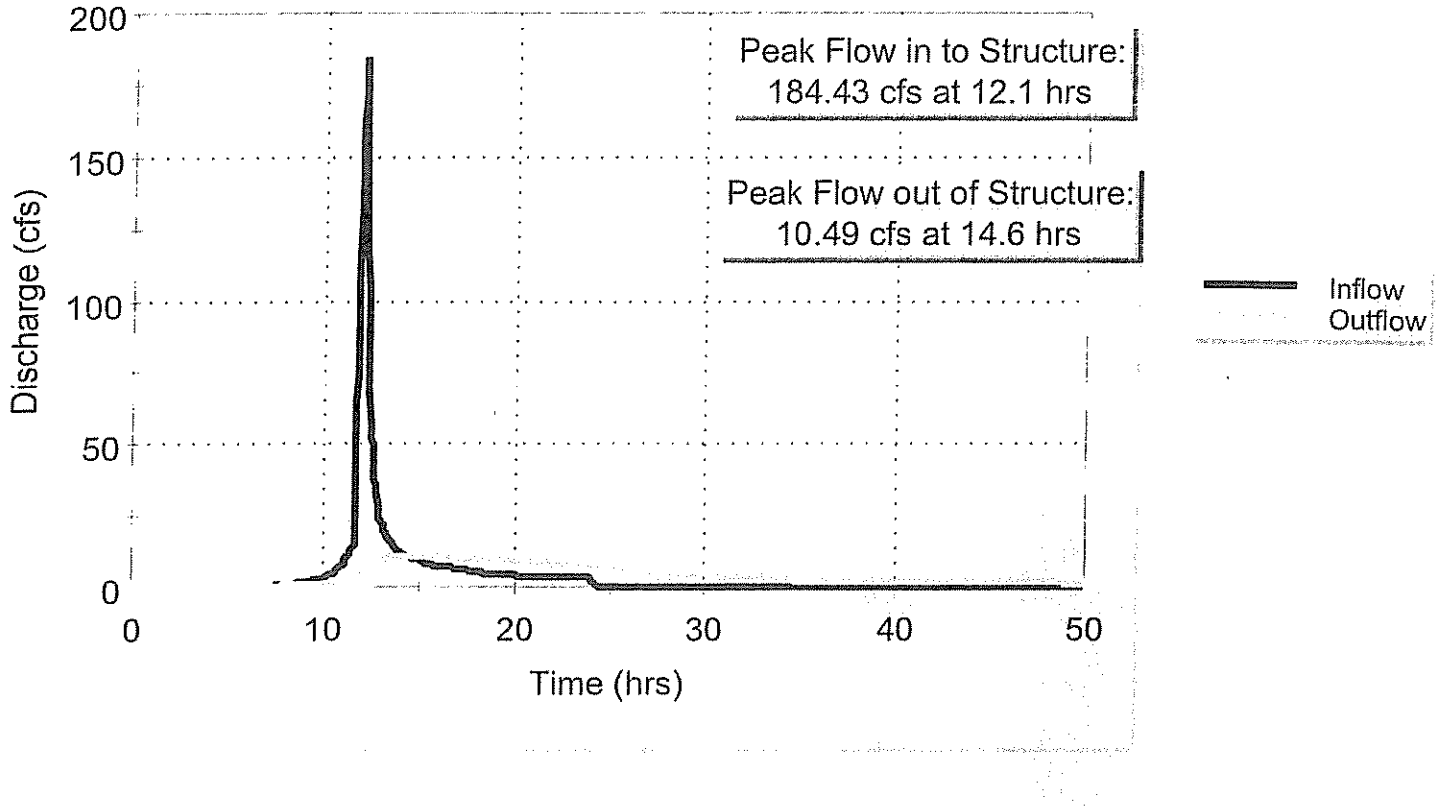
Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	33.00	33.00	99.99	4.590	0.006
		6. Grassed waterway	28.00	224.00	800.00	7.930	0.028
		6. Grassed waterway	3.00	27.00	900.00	2.590	0.096
#1	**1**	**Time of Concentration:**					**0.130**
#2	1	3. Short grass pasture	33.00	23.10	70.00	4.590	0.004
		6. Grassed waterway	5.00	60.00	1,200.00	3.350	0.099
#2	**1**	**Time of Concentration:**					**0.103**
#3	1	3. Short grass pasture	33.00	33.00	100.00	4.590	0.006
		6. Grassed waterway	5.00	15.00	300.00	3.350	0.024
#3	**1**	**Time of Concentration:**					**0.030**
#4	1	3. Short grass pasture	33.00	29.70	90.00	4.590	0.005
		6. Grassed waterway	3.00	15.00	500.00	2.590	0.053
		8. Large gullies, diversions, and low flowing streams	33.00	82.50	250.00	17.230	0.004
#4	**1**	**Time of Concentration:**					**0.062**
#5	1	3. Short grass pasture	33.00	29.70	90.00	4.590	0.005

H-105

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
		8. Large gullies, diversions, and low flowing streams	30.00	180.00	600.00	16.430	0.010
		6. Grassed waterway	3.00	24.00	800.00	2.590	0.085
#5	**1**	**Time of Concentration:**					**0.100**
#6	1	3. Short grass pasture	5.00	15.00	300.00	1.780	0.046
		6. Grassed waterway	3.00	27.00	900.00	2.590	0.096
#6	**1**	**Time of Concentration:**					**0.142**

Inflow/Outflow Hydrographs for Structure # 3



SEDIMENT BASIN 6

TAKEN FROM CELL 4F MODIFICATION

IESI PA Bethlehem Landfill
Sedimentation Basin 6

Post Development

JMM

H-109

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	25 yr - 24 hr
Rainfall Depth:	5.720 inches

H-110

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	#2	0.000	0.000	Cul 14
Null	#2	==>	#3	0.000	0.000	Cul 15/DS-3 Cul 15/DS-3
Null	#3	==>	#5	0.000	0.000	Cul 16 cul 16
Pond	#4	==>	End	0.000	0.000	Basin 6
Null	#5	==>	#4	0.000	0.000	Channel C

#1 *Null*
#2 *Null*
#3 *Null*
#5 *Null*
#4 *Pond*

Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1		0.900	0.900	3.12	0.26
#2		5.000	5.900	20.44	1.69
#3		0.900	6.800	23.56	1.94
#5		4.800	11.600	40.18	3.32
#4	In	1.600	13.200	45.02	3.70
	Out			7.38	3.31

Structure Detail:

Structure #1 (Null)

Cul 14

Structure #2 (Null)

Cul 15/DS-3

Cul 15/DS-3

Structure #3 (Null)

Cul 16

cul 16

Structure #5 (Null)

Channel C

Structure #4 (Pond)

Basin 6

Pond Inputs:

Initial Pool Elev:	460.01
Initial Pool:	0.00 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev	Number of Holes per Elev
36.00	8.40	24.00	450.00	5.00	0.0120	468.40	10

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
468.90	22.50	3.00:1	3.00:1	125.00

Pond Results:

Peak Elevation:	467.27
Dewater Time:	0.89 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
460.00	0.068	0.000	0.000		
460.01	0.068	0.001	0.000		
460.50	0.085	0.038	0.000		
461.00	0.104	0.085	0.000		
461.50	0.125	0.142	0.000		
462.00	0.148	0.211	0.000		
462.50	0.173	0.291	0.000		
463.00	0.200	0.384	0.000		Low hole SPW #1
463.50	0.229	0.491	0.743	8.75	
464.00	0.260	0.613	1.050	3.40	
464.50	0.292	0.751	2.029	2.85	
465.00	0.327	0.906	2.536	1.65	
465.50	0.364	1.079	3.690	1.30	
466.00	0.402	1.270	4.356	1.00	
466.50	0.443	1.481	5.656	0.90	
467.00	0.485	1.713	6.456	0.90	
467.25	0.507	1.837	7.335	0.60	
467.27	0.509	1.847	7.377	0.05	Peak Stage
467.40	0.521	1.915	7.675		
467.50	0.530	1.967	7.884		
467.75	0.553	2.102	8.890		
467.90	0.567	2.186	9.298		
468.00	0.576	2.244	9.548		
468.40	0.615	2.482	10.448		Spillway #1
468.50	0.625	2.544	10.655		
468.90	0.665	2.802	11.431		Spillway #2
469.00	0.675	2.869	26.265		
469.50	0.727	3.219	109.819		
470.00	0.781	3.596	380.004		
470.50	0.844	4.002	696.180		
471.00	0.910	4.440	1,078.654		

Detailed Discharge Table

Elevation	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
460.00	0.000	0.000	0.000
460.01	0.000	0.000	0.000
460.50	0.000	0.000	0.000
461.00	0.000	0.000	0.000
461.50	0.000	0.000	0.000
462.00	0.000	0.000	0.000
462.50	0.000	0.000	0.000
463.00	2.00>0.000	0.000	0.000
463.50	0.743	0.000	0.743
464.00	2.00>1.050	0.000	1.050
464.50	2.029	0.000	2.029
465.00	2.00>2.536	0.000	2.536
465.50	3.690	0.000	3.690
466.00	2.00>4.356	0.000	4.356
466.50	5.656	0.000	5.656
467.00	2.00>6.456	0.000	6.456
467.25	7.335	0.000	7.335
467.40	7.675	0.000	7.675
467.50	2.00>7.884	0.000	7.884
467.75	8.890	0.000	8.890
467.90	9.298	0.000	9.298
468.00	9.548	0.000	9.548
468.40	10.448	0.000	10.448
468.50	10.655	0.000	10.655
468.90	11.431	0.000	11.431
469.00	13.579	12.686	26.265
469.50	33.707	76.112	109.819
470.00	43.051	336.952	380.004
470.50	49.322	646.859	696.180
471.00	54.146	1,024.508	1,078.654

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	0.900	0.040	0.000	0.000	79.000	F	3.12	0.257
	Σ	**0.900**						**3.12**	**0.257**
#2	1	5.000	0.073	0.000	0.000	79.000	F	17.32	1.429
	Σ	**5.900**						**20.44**	**1.687**
#3	1	0.900	0.041	0.000	0.000	79.000	F	3.12	0.257
	Σ	**6.800**						**23.56**	**1.944**
#5	1	4.800	0.040	0.000	0.000	79.000	M	16.63	1.372
	Σ	**11.600**						**40.18**	**3.316**
#4	1	1.600	0.009	0.000	0.000	73.000	F	4.84	0.381
	Σ	**13.200**						**45.02**	**3.697**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	33.00	19.80	60.00	4.590	0.003
		6. Grassed waterway	1.00	2.00	200.00	1.500	0.037
#1	**1**	**Time of Concentration:**					**0.040**
#2	1	3. Short grass pasture	33.00	23.10	70.00	4.590	0.004
		6. Grassed waterway	3.00	19.50	650.00	2.590	0.069
#2	**1**	**Time of Concentration:**					**0.073**
#3	1	3. Short grass pasture	33.00	23.10	70.00	4.590	0.004
		6. Grassed waterway	1.00	2.00	200.00	1.500	0.037
#3	**1**	**Time of Concentration:**					**0.041**
#4	1	3. Short grass pasture	33.00	49.50	150.00	4.590	0.009
#4	**1**	**Time of Concentration:**					**0.009**
#5	1	3. Short grass pasture	33.00	29.70	90.00	4.590	0.005
		6. Grassed waterway	3.00	6.00	200.00	2.590	0.021
		8. Large gullies, diversions, and low flowing streams	20.00	140.00	700.00	13.410	0.014
#5	**1**	**Time of Concentration:**					**0.040**

IESI PA Bethlehem Landfill
Sedimentation Basin 6

Post Development

JMM

H-117

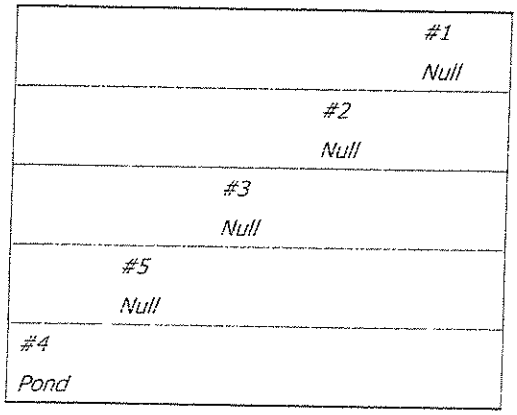
General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	100 yr - 24 hr
Rainfall Depth:	7.070 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	#2	0.000	0.000	Cul 14
Null	#2	==>	#3	0.000	0.000	Cul 15/DS-3 Cul 15/DS-3
Null	#3	==>	#5	0.000	0.000	Cul 16 cul 16
Pond	#4	==>	End	0.000	0.000	Basin 6
Null	#5	==>	#4	0.000	0.000	Channel C



Filename: 1162.1B6Rev25yr.sc4

Printed 05-29-2009

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	0.900	0.900	4.10	0.35
#2	5.000	5.900	26.89	2.29
#3	0.900	6.800	30.99	2.63
#5	4.800	11.600	52.87	4.49
#4 In	1.600	13.200	59.43	5.03
#4 Out			10.56	4.64

H-120

Structure Detail:

Structure #1 (Null)

Cul 14

Structure #2 (Null)

Cul 15/DS-3

Cul 15/DS-3

Structure #3 (Null)

Cul 16

cul 16

Structure #5 (Null)

Channel C

Structure #4 (Pond)

Basin 6

Pond Inputs:

Initial Pool Elev:	460.01
Initial Pool:	0.00 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev	Number of Holes per Elev
36.00	8.40	24.00	450.00	5.00	0.0120	468.40	10

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
468.90	22.50	3.00:1	3.00:1	125.00

Pond Results:

Peak Elevation:	468.45
Dewater Time:	0.92 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
460.00	0.068	0.000	0.000		
460.01	0.068	0.001	0.000		
460.50	0.085	0.038	0.000		
461.00	0.104	0.085	0.000		
461.50	0.125	0.142	0.000		
462.00	0.148	0.211	0.000		
462.50	0.173	0.291	0.000		
463.00	0.200	0.384	0.000		Low hole SPW #1
463.50	0.229	0.491	0.743	8.75	
464.00	0.260	0.613	1.050	1.65	
464.50	0.292	0.751	2.029	3.75	
465.00	0.327	0.906	2.536	1.70	
465.50	0.364	1.079	3.690	1.30	
466.00	0.402	1.270	4.356	1.05	
466.50	0.443	1.481	5.656	0.90	
467.00	0.485	1.713	6.456	0.75	
467.25	0.507	1.837	7.335	0.40	
467.40	0.521	1.915	7.675	0.20	
467.50	0.530	1.967	7.884	0.15	
467.75	0.553	2.102	8.890	0.35	
467.90	0.567	2.186	9.298	0.20	
468.00	0.576	2.244	9.548	0.10	
468.40	0.615	2.482	10.448	0.65	Spillway #1
468.45	0.620	2.515	10.560	0.10	Peak Stage
468.50	0.625	2.544	10.655		
468.90	0.665	2.802	11.431		Spillway #2
469.00	0.675	2.869	26.265		
469.50	0.727	3.219	109.819		
470.00	0.781	3.596	380.004		
470.50	0.844	4.002	696.180		
471.00	0.910	4.440	1,078.654		

Detailed Discharge Table

Elevation	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
460.00	0.000	0.000	0.000
460.01	0.000	0.000	0.000
460.50	0.000	0.000	0.000
461.00	0.000	0.000	0.000
461.50	0.000	0.000	0.000
462.00	0.000	0.000	0.000
462.50	0.000	0.000	0.000
463.00	2.00>0.000	0.000	0.000
463.50	0.743	0.000	0.743
464.00	2.00>1.050	0.000	1.050
464.50	2.029	0.000	2.029
465.00	2.00>2.536	0.000	2.536
465.50	3.690	0.000	3.690
466.00	2.00>4.356	0.000	4.356
466.50	5.656	0.000	5.656
467.00	2.00>6.456	0.000	6.456
467.25	7.335	0.000	7.335
467.40	7.675	0.000	7.675
467.50	2.00>7.884	0.000	7.884
467.75	8.890	0.000	8.890
467.90	9.298	0.000	9.298
468.00	9.548	0.000	9.548
468.40	10.448	0.000	10.448
468.50	10.655	0.000	10.655
468.90	11.431	0.000	11.431
469.00	13.579	12.686	26.265
469.50	33.707	76.112	109.819
470.00	43.051	336.952	380.004
470.50	49.322	646.859	696.180
471.00	54.146	1,024.508	1,078.654

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	0.900	0.040	0.000	0.000	79.000	F	4.10	0.349
	Σ	**0.900**						**4.10**	**0.349**
#2	1	5.000	0.073	0.000	0.000	79.000	F	22.79	1.937
	Σ	**5.900**						**26.89**	**2.286**
#3	1	0.900	0.041	0.000	0.000	79.000	F	4.10	0.349
	Σ	**6.800**						**30.99**	**2.634**
#5	1	4.800	0.040	0.000	0.000	79.000	M	21.88	1.859
	Σ	**11.600**						**52.87**	**4.494**
#4	1	1.600	0.009	0.000	0.000	73.000	F	6.56	0.533
	Σ	**13.200**						**59.43**	**5.026**

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	33.00	19.80	60.00	4.590	0.003
		6. Grassed waterway	1.00	2.00	200.00	1.500	0.037
#1	**1**	**Time of Concentration:**					**0.040**
#2	1	3. Short grass pasture	33.00	23.10	70.00	4.590	0.004
		6. Grassed waterway	3.00	19.50	650.00	2.590	0.069
#2	**1**	**Time of Concentration:**					**0.073**
#3	1	3. Short grass pasture	33.00	23.10	70.00	4.590	0.004
		6. Grassed waterway	1.00	2.00	200.00	1.500	0.037
#3	**1**	**Time of Concentration:**					**0.041**
#4	1	3. Short grass pasture	33.00	49.50	150.00	4.590	0.009
#4	**1**	**Time of Concentration:**					**0.009**
#5	1	3. Short grass pasture	33.00	29.70	90.00	4.590	0.005
		6. Grassed waterway	3.00	6.00	200.00	2.590	0.021
		8. Large gullies, diversions, and low flowing streams	20.00	140.00	700.00	13.410	0.014
#5	**1**	**Time of Concentration:**					**0.040**

Bethlehem Landfill Southeast Realignment

AREA "A"

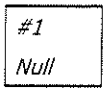
Post-Development

JMM

H-126

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	==>	End	0.000	0.000	Post Dev. Area A



General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	2 yr - 24 hr
Rainfall Depth:	3.000 inches

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	5.700	5.700	0.20	0.07

H-129

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	5.700	0.395	0.000	0.000	55.000	M	0.20	0.074
	Σ	**5.700**						**0.20**	**0.074**

H-130

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 24 hr
Rainfall Depth:	4.560 inches

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	5.700	5.700	1.91	0.29

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	5.700	0.395	0.000	0.000	55.000	M	1.91	0.292
	Σ	**5.700**						**1.91**	**0.292**

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	25 yr - 24 hr
Rainfall Depth:	5.520 inches

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	5.700	5.700	3.48	0.47

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	5.700	0.395	0.000	0.000	55.000	M	3.48	0.474
	$\sum$	**5.700**						**3.48**	**0.474**

H-130

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	100 yr - 24 hr
Rainfall Depth:	7.440 inches

H-137

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	5.700	5.700	7.36	0.91

H-138

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	5.700	0.395	0.000	0.000	55.000	M	7.36	0.913
	Σ	**5.700**						**7.36**	**0.913**

H-139

SECTION 10

Appendix I

Stormwater Detention Basin

Appendix I

Stormwater Detention Basin

APPENDIX I

STORMWATER DETENTION BASINS

No modifications are proposed to existing Basins #1, #3, #4 and #6. Stormwater detention Basin #2 has been re-designed and re-configured to allow for the increase in tributary area as well as the slight increase in impervious area as a result of the Northern Realignment. During construction activities the basin will serve as a sedimentation basin. Details associated with the sedimentation basin are included within the Erosion and Sediment Control Plan Narrative Form I document of the Solid Waste Major Permit Modification Application. Upon completion of landfill operations onsite the sediment basin will be converted to a dry extended detention basin. The permanent detention basin is the subject of this report and is what is detailed on the Post Construction Stormwater Management Plans. The detention basin will also serve to meet the water quality requirements of the Ordinance.

Based upon the routing calculations provided in Appendix H the following are peak stages within Basin 2.

Storm Event	Peak Stage
2 yr. – 24 hr.	467.16'
10 yr. – 24 hr.	471.79'
25 yr. – 24 hr.	474.36'
100 yr. – 24 hr.	476.33'

Printouts for the routing of each storm event are attached hereto.

In order to meet discharge rate requirements which are extremely low, dewatering times increase since the bottom 7.5 feet of the basin is dewatered by one (1) 2.0 inch orifice. PA BMP Manual recommends a dewatering time between 24 and 72 hours from the end of the design storm. Assuming a water elevation at the top of the riser (476.25) resulting from a large storm event or a series of storm events and an allowable dewatering time of 72 hours the water elevation would be reduced to elevation 468.50 or 7.75 feet below the top of riser. Under this scenario we routed each storm event assuming a permanent pool of 468.50. The following results are presented:

Assuming Permanent Pool @ Elev. 468.50

Storm Event	Peak Stage	Peak Discharge
2 yr-24 hr	472.01'	1.25 cfs
10 yr-24 hr	475.17'	4.29 cfs
25 yr-24 hr	476.01'	10.34 cfs
100 yr-24 hr	477.50'	49.88 cfs

As outlined above assuming a partially full basin the 100 year discharge from the riser is 49.88 cfs. While this is greater than the approved discharge assuming a dry basin at 13.1 cfs, we contend the discharge is to an established stream bed from a barrel that has been existing since the late 1990's. Vegetation within the stream bed and at the barrel is well established and not proposed to be disturbed by the project. The next downstream structure from the outlet of Basin #2 is an existing double culvert beneath Applebutter Road. The existing culvert is a two (2) barrel 35" x 24" CMP (30" round equivalent). The existing stream longitudinal slope at the Applebutter Road crossing is +/-2%. For analysis we have assumed a 1% slope for the culvert beneath Applebutter Road, a maximum head of 4.0 feet and a length of 40 feet. The maximum capacity (flowing full) of each culvert is 36 cfs, thus the total capacity of the structure having two (2) culverts is 72 cfs. Accounting for discharges from the proposed project (Area A, Basin #1 and Basin #2) which are tributary to the crossing. The calculated 100 year-24 hour rate of runoff from these areas is (10 cfs, 49 cfs and 7 cfs) 66 cfs. This being less than the capacity of the structure and accounts for some 6 cfs from other unanalyzed areas of the drainage shed.

Therefore, we conclude adequate capacity exists within the downstream facilities to safely pass the 100 year storm even assuming the basin has not fully de-watered prior to a 100 year event. Please note that the onsite area tributary to the structure for the 25 year event is (1.4 cfs, 10.3 cfs & 3.5 cfs) 15.2 cfs well below the capacity of the structure.

Basin Design Requirements and References:

Township of Lower Saucon PA, Part II General Legislation, Stormwater Management, Article III Stormwater Management, SS 137-18 Detention Basins. Section O specifies the following; All stormwater detention facilities shall provide a minimum 1.0 foot freeboard above the maximum pool elevation associated with the two-year through twenty-five-year runoff events. A 0.5 foot freeboard shall be provided above the maximum pool elevation of the one-hundred-year runoff event. The freeboard shall be measured from the maximum pool elevation to the elevation of the emergency spillway. The two-year through one-hundred-year storm events shall be controlled by the primary outlet structure. An emergency spillway for each basin shall be designed to pass the one-hundred-year return frequency storm peak basin inflow rate, as if the basin were full prior to the storm, with a minimum 0.5 foot freeboard measured to the top of basin. The freeboard criteria shall be met considering any off-site areas tributary to the basin as developed, as applicable. If this detention facility is considered to be a dam as per DEP Chapter 105, the design of the facility must be consistent with the Chapter 105 regulations, and may be required to pass a storm greater than the one-hundred-year event.

Leigh Valley Planning Commission – administering the Saucon Creek Watershed Act 167 Storm Water Management Ordinance, Article III Stormwater Management Requirements, Section 304 Calculation Methodology, Item C; All storm water detention facilities shall provide a minimum 1.0 foot freeboard above the maximum pool elevation associated with the 2 through 25-year runoff events. An emergency spillway shall be designed to pass the 100-year runoff event with a minimum 0.5 foot freeboard.

As detailed within the Basin #2 Routing Computations the maximum pool elevations are as follows: 2-year 467.16', 10-year 471.79', 25-year 474.36', and 100-year 476.33'. The Basin #2 Emergency Spillway Elevation is proposed at 476.95'. Thus, 1.0' of freeboard is provided for the 2 – 25-year events (minimum 2.2') and 0.5' of freeboard is provided for the 100-year event (0.58'). All events are passed by the Principle Spillway and the Emergency Spillway is designed to pass the post 100-year rate of runoff with 0.5' of freeboard to the top of the berm as detailed in Appendix M.

Basin Design Requirements are met as detailed within both the PCSM Report Narrative and supporting Appendices.

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	2 yr - 24 hr
Rainfall Depth:	3.000 inches

Pool EL. = 460.00'

Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#13		0.770	0.770	0.45	0.03
#12		2.960	2.960	4.91	0.39
#10		9.050	9.050	11.87	0.90
#11		0.710	0.710	0.77	0.06
#9		14.140	14.140	7.88	0.94
#8		0.650	0.650	1.04	0.08
#5		12.990	12.990	6.02	0.86
#3		18.180	18.180	10.39	1.21
#2		5.060	23.240	14.04	1.62
#4		5.450	41.680	23.66	2.90
#6		1.530	58.710	32.21	4.09
#7	In	2.070	73.560	47.37	5.51
	Out			0.28	0.85

Initial Pool:	0.01 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Number of Holes per Elev
36.00	16.25	30.00	100.00	4.50	0.0240	476.25	1

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
476.95	20.00	4.00:1	4.00:1	60.00

Pond Results:

Peak Elevation:	467.16 ft
Dewater Time:	14.67 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
460.00	0.600	0.000	0.000		
460.01	0.600	0.006	0.000		Low hole SPW #1
460.50	0.602	0.300	0.074	48.46*	
461.00	0.604	0.602	0.105	34.90*	
461.50	0.606	0.904	0.128	28.54*	
462.00	0.608	1.208	0.148	24.78*	
462.50	0.638	1.519	0.166	22.74*	
463.00	0.669	1.846	0.182	21.76*	
463.50	0.701	2.189	0.196	21.12*	
464.00	0.733	2.547	0.210	20.67*	
464.50	0.766	2.922	0.223	20.37*	
465.00	0.900	3.338	0.235	21.45*	
465.50	0.828	3.770	0.246	21.23*	
466.00	0.856	4.191	0.257	19.81*	
466.50	0.885	4.626	0.268	19.68*	
467.00	0.914	5.076	0.278	19.59*	
467.16	0.924	5.224	0.281	6.95	Peak Stage
467.50	0.944	5.540	0.287		
468.00	0.974	6.020	0.371		
468.50	1.005	6.514	0.411		

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
469.00	1.036	7.025	0.444		
469.50	1.068	7.551	0.472		
470.00	1.100	8.093	0.795		
470.50	1.128	8.650	0.942		
471.00	1.157	9.221	1.059		
471.50	1.186	9.807	1.160		
472.00	1.216	10.407	1.251		
472.50	1.300	11.036	1.334		
473.00	1.276	11.680	1.411		
473.50	1.306	12.325	1.484		
474.00	1.337	12.986	1.552		
474.50	1.368	13.662	1.617		
474.53	1.370	13.703	1.621		
474.75	1.384	14.006	1.649		
475.00	1.400	14.354	1.680		
475.33	1.416	14.819	6.607		
475.50	1.425	15.060	7.756		
475.54	1.427	15.117	7.997		
475.75	1.437	15.418	9.138		
475.80	1.440	15.490	9.385		
476.00	1.450	15.779	10.306		
476.25	1.462	16.143	11.339		Spillway #1
476.50	1.475	16.510	12.274		
476.75	1.487	16.880	13.137		
476.95	1.497	17.179	17.112		Spillway #2
477.00	1.500	17.254	19.962		
477.50	1.550	18.016	48.891		
478.00	1.600	18.804	187.682		
478.50	1.650	19.616	341.764		
478.53	1.660	19.666	342.103		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
460.00	0.000	0.000	0.000
460.01	2.00>0.000	0.000	0.000
460.50	0.074	0.000	0.074
461.00	0.105	0.000	0.105
461.50	0.128	0.000	0.128
462.00	0.148	0.000	0.148
462.50	0.166	0.000	0.166
463.00	0.182	0.000	0.182
463.50	0.196	0.000	0.196
464.00	0.210	0.000	0.210
464.50	0.223	0.000	0.223
465.00	0.235	0.000	0.235
465.50	0.246	0.000	0.246
466.00	0.257	0.000	0.257
466.50	0.268	0.000	0.268
467.00	0.278	0.000	0.278
467.50	2.00>0.287	0.000	0.287
468.00	0.371	0.000	0.371
468.50	0.411	0.000	0.411
469.00	0.444	0.000	0.444
469.50	4.00>0.472	0.000	0.472
470.00	0.795	0.000	0.795
470.50	0.942	0.000	0.942
471.00	1.059	0.000	1.059
471.50	1.160	0.000	1.160
472.00	1.251	0.000	1.251
472.50	1.334	0.000	1.334
473.00	1.411	0.000	1.411
473.50	1.484	0.000	1.484
474.00	1.552	0.000	1.552
474.50	1.617	0.000	1.617
474.53	1.621	0.000	1.621
474.75	1.649	0.000	1.649
475.00	18.00>1.680	0.000	1.680
475.33	6.607	0.000	6.607
475.50	7.756	0.000	7.756
475.54	7.997	0.000	7.997
475.75	9.138	0.000	9.138
475.80	9.385	0.000	9.385
476.00	10.306	0.000	10.306

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
476.25	11.339	0.000	11.339
476.50	12.274	0.000	12.274
476.75	13.137	0.000	13.137
476.95	17.112	0.000	17.112
477.00	18.977	0.985	19.962
477.50	38.052	10.838	48.891
478.00	45.024	142.658	187.682
478.50	51.053	290.711	341.764
478.53	51.392	290.711	342.103

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 24 hr
Rainfall Depth:	4.560 inches

Pool EL. = 460.00'

Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#13		0.770	0.770	1.20	0.09
#12		2.960	2.960	8.64	0.73
#10		9.050	9.050	22.90	1.83
#11		0.710	0.710	1.60	0.12
#9		14.140	14.140	16.50	1.92
#8		0.650	0.650	1.86	0.15
#5		12.990	12.990	12.76	1.76
#3		18.180	18.180	21.69	2.46
#2		5.060	23.240	28.78	3.25
#4		5.450	41.680	48.45	5.84
#6		1.530	58.710	66.21	8.29
#7	In	2.070	73.560	98.30	11.18
	Out			1.21	3.13

Initial Pool:	0.01 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Number of Holes per Elev
36.00	16.25	30.00	100.00	4.50	0.0240	476.25	1

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
476.95	20.00	4.00:1	4.00:1	60.00

Pond Results:

Peak Elevation:	471.79 ft
Dewater Time:	18.98 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
460.00	0.600	0.000	0.000		
460.01	0.600	0.006	0.000		Low hole SPW #1
460.50	0.602	0.300	0.074	48.46*	
461.00	0.604	0.602	0.105	34.90*	
461.50	0.606	0.904	0.128	28.54*	
462.00	0.608	1.208	0.148	24.78*	
462.50	0.638	1.519	0.166	22.74*	
463.00	0.669	1.846	0.182	21.76*	
463.50	0.701	2.189	0.196	21.12*	
464.00	0.733	2.547	0.210	20.67*	
464.50	0.766	2.922	0.223	20.37*	
465.00	0.900	3.338	0.235	21.45*	
465.50	0.828	3.770	0.246	21.23*	
466.00	0.856	4.191	0.257	19.81*	
466.50	0.885	4.626	0.268	19.68*	
467.00	0.914	5.076	0.278	19.59*	
467.50	0.944	5.540	0.287	19.55*	
468.00	0.974	6.020	0.371	15.63*	
468.50	1.005	6.514	0.411	14.56*	
469.00	1.036	7.025	0.444	13.92*	

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
469.50	1.068	7.551	0.472	13.48*	
470.00	1.100	8.093	0.795	8.25*	
470.50	1.128	8.650	0.942	7.75	
471.00	1.157	9.221	1.059	6.90	
471.50	1.186	9.807	1.160	6.40	
471.79	1.204	10.159	1.213	4.00	Peak Stage
472.00	1.216	10.407	1.251		
472.50	1.300	11.036	1.334		
473.00	1.276	11.680	1.411		
473.50	1.306	12.325	1.484		
474.00	1.337	12.986	1.552		
474.50	1.368	13.662	1.617		
474.53	1.370	13.703	1.621		
474.75	1.384	14.006	1.649		
475.00	1.400	14.354	1.680		
475.33	1.416	14.819	6.607		
475.50	1.425	15.060	7.756		
475.54	1.427	15.117	7.997		
475.75	1.437	15.418	9.138		
475.80	1.440	15.490	9.385		
476.00	1.450	15.779	10.306		
476.25	1.462	16.143	11.339		Spillway #1
476.50	1.475	16.510	12.274		
476.75	1.487	16.880	13.137		
476.95	1.497	17.179	17.112		Spillway #2
477.00	1.500	17.254	19.962		
477.50	1.550	18.016	48.891		
478.00	1.600	18.804	187.682		
478.50	1.650	19.616	341.764		
478.53	1.660	19.666	342.103		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
460.00	0.000	0.000	0.000
460.01	2.00>0.000	0.000	0.000
460.50	0.074	0.000	0.074
461.00	0.105	0.000	0.105
461.50	0.128	0.000	0.128
462.00	0.148	0.000	0.148
462.50	0.166	0.000	0.166
463.00	0.182	0.000	0.182
463.50	0.196	0.000	0.196
464.00	0.210	0.000	0.210
464.50	0.223	0.000	0.223
465.00	0.235	0.000	0.235
465.50	0.246	0.000	0.246
466.00	0.257	0.000	0.257
466.50	0.268	0.000	0.268
467.00	0.278	0.000	0.278
467.50	2.00>0.287	0.000	0.287
468.00	0.371	0.000	0.371
468.50	0.411	0.000	0.411
469.00	0.444	0.000	0.444
469.50	4.00>0.472	0.000	0.472
470.00	0.795	0.000	0.795
470.50	0.942	0.000	0.942
471.00	1.059	0.000	1.059
471.50	1.160	0.000	1.160
472.00	1.251	0.000	1.251
472.50	1.334	0.000	1.334
473.00	1.411	0.000	1.411
473.50	1.484	0.000	1.484
474.00	1.552	0.000	1.552
474.50	1.617	0.000	1.617
474.53	1.621	0.000	1.621
474.75	1.649	0.000	1.649
475.00	18.00>1.680	0.000	1.680
475.33	6.607	0.000	6.607
475.50	7.756	0.000	7.756
475.54	7.997	0.000	7.997
475.75	9.138	0.000	9.138
475.80	9.385	0.000	9.385
476.00	10.306	0.000	10.306

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
476.25	11.339	0.000	11.339
476.50	12.274	0.000	12.274
476.75	13.137	0.000	13.137
476.95	17.112	0.000	17.112
477.00	18.977	0.985	19.962
477.50	38.052	10.838	48.891
478.00	45.024	142.658	187.682
478.50	51.053	290.711	341.764
478.53	51.392	290.711	342.103

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	25 yr - 24 hr
Rainfall Depth:	5.520 inches

Pool EL. = 460.00'

Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#13		0.770	0.770	1.73	0.13
#12		2.960	2.960	10.93	0.95
#10		9.050	9.050	29.89	2.45
#11		0.710	0.710	2.14	0.17
#9		14.140	14.140	22.14	2.57
#8		0.650	0.650	2.36	0.20
#5		12.990	12.990	17.18	2.36
#3		18.180	18.180	29.08	3.30
#2		5.060	23.240	38.45	4.34
#4		5.450	41.680	64.81	7.79
#6		1.530	58.710	88.50	11.09
#7	In	2.070	73.560	131.61	14.98
	Out			1.60	4.49

Initial Pool:	0.01 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Number of Holes per Elev
36.00	16.25	30.00	100.00	4.50	0.0240	476.25	1

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
476.95	20.00	4.00:1	4.00:1	60.00

Pond Results:

Peak Elevation:	474.36 ft
Dewater Time:	20.10 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
460.00	0.600	0.000	0.000		
460.01	0.600	0.006	0.000		Low hole SPW #1
460.50	0.602	0.300	0.074	48.46*	
461.00	0.604	0.602	0.105	34.90*	
461.50	0.606	0.904	0.128	28.54*	
462.00	0.608	1.208	0.148	24.78*	
462.50	0.638	1.519	0.166	22.74*	
463.00	0.669	1.846	0.182	21.76*	
463.50	0.701	2.189	0.196	21.12*	
464.00	0.733	2.547	0.210	20.67*	
464.50	0.766	2.922	0.223	20.37*	
465.00	0.900	3.338	0.235	21.45*	
465.50	0.828	3.770	0.246	21.23*	
466.00	0.856	4.191	0.257	19.81*	
466.50	0.885	4.626	0.268	19.68*	
467.00	0.914	5.076	0.278	19.59*	
467.50	0.944	5.540	0.287	19.55*	
468.00	0.974	6.020	0.371	15.63*	
468.50	1.005	6.514	0.411	14.56*	
469.00	1.036	7.025	0.444	13.92*	

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
469.50	1.068	7.551	0.472	13.48*	
470.00	1.100	8.093	0.795	8.25*	
470.50	1.128	8.650	0.942	7.15*	
471.00	1.157	9.221	1.059	6.52*	
471.50	1.186	9.807	1.160	6.11*	
472.00	1.216	10.407	1.251	5.81*	
472.50	1.300	11.036	1.334	5.70*	
473.00	1.276	11.680	1.411	5.65	
473.50	1.306	12.325	1.484	5.40	
474.00	1.337	12.986	1.552	5.30	
474.36	1.360	13.479	1.600	4.15	Peak Stage
474.50	1.368	13.662	1.617		
474.53	1.370	13.703	1.621		
474.75	1.384	14.006	1.649		
475.00	1.400	14.354	1.680		
475.33	1.416	14.819	6.607		
475.50	1.425	15.060	7.756		
475.54	1.427	15.117	7.997		
475.75	1.437	15.418	9.138		
475.80	1.440	15.490	9.385		
476.00	1.450	15.779	10.306		
476.25	1.462	16.143	11.339		Spillway #1
476.50	1.475	16.510	12.274		
476.75	1.487	16.880	13.137		
476.95	1.497	17.179	17.112		Spillway #2
477.00	1.500	17.254	19.962		
477.50	1.550	18.016	48.891		
478.00	1.600	18.804	187.682		
478.50	1.650	19.616	341.764		
478.53	1.660	19.666	342.103		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
460.00	0.000	0.000	0.000
460.01	2.00>0.000	0.000	0.000
460.50	0.074	0.000	0.074
461.00	0.105	0.000	0.105
461.50	0.128	0.000	0.128
462.00	0.148	0.000	0.148
462.50	0.166	0.000	0.166
463.00	0.182	0.000	0.182
463.50	0.196	0.000	0.196
464.00	0.210	0.000	0.210
464.50	0.223	0.000	0.223
465.00	0.235	0.000	0.235
465.50	0.246	0.000	0.246
466.00	0.257	0.000	0.257
466.50	0.268	0.000	0.268
467.00	0.278	0.000	0.278
467.50	2.00>0.287	0.000	0.287
468.00	0.371	0.000	0.371
468.50	0.411	0.000	0.411
469.00	0.444	0.000	0.444
469.50	4.00>0.472	0.000	0.472
470.00	0.795	0.000	0.795
470.50	0.942	0.000	0.942
471.00	1.059	0.000	1.059
471.50	1.160	0.000	1.160
472.00	1.251	0.000	1.251
472.50	1.334	0.000	1.334
473.00	1.411	0.000	1.411
473.50	1.484	0.000	1.484
474.00	1.552	0.000	1.552
474.50	1.617	0.000	1.617
474.53	1.621	0.000	1.621
474.75	1.649	0.000	1.649
475.00	18.00>1.680	0.000	1.680
475.33	6.607	0.000	6.607
475.50	7.756	0.000	7.756
475.54	7.997	0.000	7.997
475.75	9.138	0.000	9.138
475.80	9.385	0.000	9.385
476.00	10.306	0.000	10.306

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
476.25	11.339	0.000	11.339
476.50	12.274	0.000	12.274
476.75	13.137	0.000	13.137
476.95	17.112	0.000	17.112
477.00	18.977	0.985	19.962
477.50	38.052	10.838	48.891
478.00	45.024	142.658	187.682
478.50	51.053	290.711	341.764
478.53	51.392	290.711	342.103

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	100 yr - 24 hr
Rainfall Depth:	7.440 inches

Pool El. = 460.00'

Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#13		0.770	0.770	2.85	0.22
#12		2.960	2.960	15.50	1.40
#10		9.050	9.050	43.96	3.76
#11		0.710	0.710	3.24	0.27
#9		14.140	14.140	33.70	3.94
#8		0.650	0.650	3.37	0.30
#5		12.990	12.990	26.30	3.62
#3		18.180	18.180	44.22	5.06
#2		5.060	23.240	58.26	6.61
#4		5.450	41.680	98.32	11.86
#6		1.530	58.710	134.55	16.94
#7	In	2.070	73.560	199.97	22.93
	Out			11.62	11.63

Initial Pool:	0.01 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Number of Holes per Elev
36.00	16.25	30.00	100.00	4.50	0.0240	476.25	1

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
476.95	20.00	4.00:1	4.00:1	60.00

Pond Results:

Peak Elevation:	476.33 ft
Dewater Time:	20.77 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
460.00	0.600	0.000	0.000		
460.01	0.600	0.006	0.000		Low hole SPW #1
460.50	0.602	0.300	0.074	48.46*	
461.00	0.604	0.602	0.105	34.90*	
461.50	0.606	0.904	0.128	28.54*	
462.00	0.608	1.208	0.148	24.78*	
462.50	0.638	1.519	0.166	22.74*	
463.00	0.669	1.846	0.182	21.76*	
463.50	0.701	2.189	0.196	21.12*	
464.00	0.733	2.547	0.210	20.67*	
464.50	0.766	2.922	0.223	20.37*	
465.00	0.900	3.338	0.235	21.45*	
465.50	0.828	3.770	0.246	21.23*	
466.00	0.856	4.191	0.257	19.81*	
466.50	0.885	4.626	0.268	19.68*	
467.00	0.914	5.076	0.278	19.59*	
467.50	0.944	5.540	0.287	19.55*	
468.00	0.974	6.020	0.371	15.63*	
468.50	1.005	6.514	0.411	14.56*	
469.00	1.036	7.025	0.444	13.92*	

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
469.50	1.068	7.551	0.472	13.48*	
470.00	1.100	8.093	0.795	8.25*	
470.50	1.128	8.650	0.942	7.15*	
471.00	1.157	9.221	1.059	6.52*	
471.50	1.186	9.807	1.160	6.11*	
472.00	1.216	10.407	1.251	5.81*	
472.50	1.300	11.036	1.334	5.70*	
473.00	1.276	11.680	1.411	5.52*	
473.50	1.306	12.325	1.484	5.40	
474.00	1.337	12.986	1.552	5.25	
474.50	1.368	13.662	1.617	5.20	
474.53	1.370	13.703	1.621	0.30	
474.75	1.384	14.006	1.649	2.25	
475.00	1.400	14.354	1.680	2.55	
475.33	1.416	14.819	6.607	3.85	
475.50	1.425	15.060	7.756	1.15	
475.54	1.427	15.117	7.997	0.25	
475.75	1.437	15.418	9.138	1.10	
475.80	1.440	15.490	9.385	0.30	
476.00	1.450	15.779	10.306	1.00	
476.25	1.462	16.143	11.339	1.65	Spillway #1
476.33	1.466	16.254	11.622	0.90	Peak Stage
476.50	1.475	16.510	12.274		
476.75	1.487	16.880	13.137		
476.95	1.497	17.179	17.112		Spillway #2
477.00	1.500	17.254	19.962		
477.50	1.550	18.016	48.891		
478.00	1.600	18.804	187.682		
478.50	1.650	19.616	341.764		
478.53	1.660	19.666	342.103		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
460.00	0.000	0.000	0.000
460.01	2.00>0.000	0.000	0.000
460.50	0.074	0.000	0.074
461.00	0.105	0.000	0.105
461.50	0.128	0.000	0.128
462.00	0.148	0.000	0.148
462.50	0.166	0.000	0.166
463.00	0.182	0.000	0.182
463.50	0.196	0.000	0.196
464.00	0.210	0.000	0.210
464.50	0.223	0.000	0.223
465.00	0.235	0.000	0.235
465.50	0.246	0.000	0.246
466.00	0.257	0.000	0.257
466.50	0.268	0.000	0.268
467.00	0.278	0.000	0.278
467.50	2.00>0.287	0.000	0.287
468.00	0.371	0.000	0.371
468.50	0.411	0.000	0.411
469.00	0.444	0.000	0.444
469.50	4.00>0.472	0.000	0.472
470.00	0.795	0.000	0.795
470.50	0.942	0.000	0.942
471.00	1.059	0.000	1.059
471.50	1.160	0.000	1.160
472.00	1.251	0.000	1.251
472.50	1.334	0.000	1.334
473.00	1.411	0.000	1.411
473.50	1.484	0.000	1.484
474.00	1.552	0.000	1.552
474.50	1.617	0.000	1.617
474.53	1.621	0.000	1.621
474.75	1.649	0.000	1.649
475.00	18.00>1.680	0.000	1.680
475.33	6.607	0.000	6.607
475.50	7.756	0.000	7.756
475.54	7.997	0.000	7.997
475.75	9.138	0.000	9.138
475.80	9.385	0.000	9.385
476.00	10.306	0.000	10.306

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
476.25	11.339	0.000	11.339
476.50	12.274	0.000	12.274
476.75	13.137	0.000	13.137
476.95	17.112	0.000	17.112
477.00	18.977	0.985	19.962
477.50	38.052	10.838	48.891
478.00	45.024	142.658	187.682
478.50	51.053	290.711	341.764
478.53	51.392	290.711	342.103

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	2 yr - 24 hr
Rainfall Depth:	3.000 inches

Pool @ El. 468.50'

Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#13		0.770	0.770	0.45	0.03
#12		2.960	2.960	4.91	0.39
#10		9.050	9.050	11.87	0.90
#11		0.710	0.710	0.77	0.06
#9		14.140	14.140	7.88	0.94
#8		0.650	0.650	1.04	0.08
#5		12.990	12.990	6.02	0.86
#3		18.180	18.180	10.39	1.21
#2		5.060	23.240	14.04	1.62
#4		5.450	41.680	23.66	2.90
#6		1.530	58.710	32.21	4.09
#7	In	2.070	73.560	47.37	5.51
	Out			1.25	3.82

Initial Pool:	6.51 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Number of Holes per Elev
36.00	16.25	30.00	100.00	4.50	0.0240	476.25	1

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
476.95	20.00	4.00:1	4.00:1	60.00

Pond Results:

Peak Elevation:	472.01 ft
Dewater Time:	19.06 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
460.00	0.600	0.000	0.000		
460.01	0.600	0.006	0.000		Low hole SPW #1
460.50	0.602	0.300	0.074	48.46*	
461.00	0.604	0.602	0.105	34.90*	
461.50	0.606	0.904	0.128	28.54*	
462.00	0.608	1.208	0.148	24.78*	
462.50	0.638	1.519	0.166	22.74*	
463.00	0.669	1.846	0.182	21.76*	
463.50	0.701	2.189	0.196	21.12*	
464.00	0.733	2.547	0.210	20.67*	
464.50	0.766	2.922	0.223	20.37*	
465.00	0.900	3.338	0.235	21.45*	
465.50	0.828	3.770	0.246	21.23*	
466.00	0.856	4.191	0.257	19.81*	
466.50	0.885	4.626	0.268	19.68*	
467.00	0.914	5.076	0.278	19.59*	
467.50	0.944	5.540	0.287	19.55*	
468.00	0.974	6.020	0.371	15.63*	
468.50	1.005	6.514	0.411	14.56*	
469.00	1.036	7.025	0.444	13.92*	

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
469.50	1.068	7.551	0.472	13.48*	
470.00	1.100	8.093	0.795	8.25*	
470.50	1.128	8.650	0.942	7.15*	
471.00	1.157	9.221	1.059	6.90	
471.50	1.186	9.807	1.160	6.40	
472.00	1.216	10.407	1.251	6.25	
472.01	1.244	10.416	1.252	0.30	Peak Stage
472.50	1.300	11.036	1.334		
473.00	1.276	11.680	1.411		
473.50	1.306	12.325	1.484		
474.00	1.337	12.986	1.552		
474.50	1.368	13.662	1.617		
474.53	1.370	13.703	1.621		
474.75	1.384	14.006	1.649		
475.00	1.400	14.354	1.680		
475.33	1.416	14.819	6.607		
475.50	1.425	15.060	7.756		
475.54	1.427	15.117	7.997		
475.75	1.437	15.418	9.138		
475.80	1.440	15.490	9.385		
476.00	1.450	15.779	10.306		
476.25	1.462	16.143	11.339		Spillway #1
476.50	1.475	16.510	12.274		
476.75	1.487	16.880	13.137		
476.95	1.497	17.179	17.112		Spillway #2
477.00	1.500	17.254	19.962		
477.50	1.550	18.016	48.891		
478.00	1.600	18.804	187.682		
478.50	1.650	19.616	341.764		
478.53	1.660	19.666	342.103		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
460.00	0.000	0.000	0.000
460.01	2.00>0.000	0.000	0.000
460.50	0.074	0.000	0.074
461.00	0.105	0.000	0.105
461.50	0.128	0.000	0.128
462.00	0.148	0.000	0.148
462.50	0.166	0.000	0.166
463.00	0.182	0.000	0.182
463.50	0.196	0.000	0.196
464.00	0.210	0.000	0.210
464.50	0.223	0.000	0.223
465.00	0.235	0.000	0.235
465.50	0.246	0.000	0.246
466.00	0.257	0.000	0.257
466.50	0.268	0.000	0.268
467.00	0.278	0.000	0.278
467.50	2.00>0.287	0.000	0.287
468.00	0.371	0.000	0.371
468.50	0.411	0.000	0.411
469.00	0.444	0.000	0.444
469.50	4.00>0.472	0.000	0.472
470.00	0.795	0.000	0.795
470.50	0.942	0.000	0.942
471.00	1.059	0.000	1.059
471.50	1.160	0.000	1.160
472.00	1.251	0.000	1.251
472.50	1.334	0.000	1.334
473.00	1.411	0.000	1.411
473.50	1.484	0.000	1.484
474.00	1.552	0.000	1.552
474.50	1.617	0.000	1.617
474.53	1.621	0.000	1.621
474.75	1.649	0.000	1.649
475.00	18.00>1.680	0.000	1.680
475.33	6.607	0.000	6.607
475.50	7.756	0.000	7.756
475.54	7.997	0.000	7.997
475.75	9.138	0.000	9.138
475.80	9.385	0.000	9.385
476.00	10.306	0.000	10.306

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
476.25	11.339	0.000	11.339
476.50	12.274	0.000	12.274
476.75	13.137	0.000	13.137
476.95	17.112	0.000	17.112
477.00	18.977	0.985	19.962
477.50	38.052	10.838	48.891
478.00	45.024	142.658	187.682
478.50	51.053	290.711	341.764
478.53	51.392	290.711	342.103

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 24 hr
Rainfall Depth:	4.560 inches

Pool @ EL. 468.50'

Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#13		0.770	0.770	1.20	0.09
#12		2.960	2.960	8.64	0.73
#10		9.050	9.050	22.90	1.83
#11		0.710	0.710	1.60	0.12
#9		14.140	14.140	16.50	1.92
#8		0.650	0.650	1.86	0.15
#5		12.990	12.990	12.76	1.76
#3		18.180	18.180	21.69	2.46
#2		5.060	23.240	28.78	3.25
#4		5.450	41.680	48.45	5.84
#6		1.530	58.710	66.21	8.29
#7	In	2.070	73.560	98.30	11.18
	Out			4.29	6.49

Initial Pool:	6.51 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Number of Holes per Elev
36.00	16.25	30.00	100.00	4.50	0.0240	476.25	1

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
476.95	20.00	4.00:1	4.00:1	60.00

Pond Results:

Peak Elevation:	475.17 ft
Dewater Time:	20.65 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
460.00	0.600	0.000	0.000		
460.01	0.600	0.006	0.000		Low hole SPW #1
460.50	0.602	0.300	0.074	48.46*	
461.00	0.604	0.602	0.105	34.90*	
461.50	0.606	0.904	0.128	28.54*	
462.00	0.608	1.208	0.148	24.78*	
462.50	0.638	1.519	0.166	22.74*	
463.00	0.669	1.846	0.182	21.76*	
463.50	0.701	2.189	0.196	21.12*	
464.00	0.733	2.547	0.210	20.67*	
464.50	0.766	2.922	0.223	20.37*	
465.00	0.900	3.338	0.235	21.45*	
465.50	0.828	3.770	0.246	21.23*	
466.00	0.856	4.191	0.257	19.81*	
466.50	0.885	4.626	0.268	19.68*	
467.00	0.914	5.076	0.278	19.59*	
467.50	0.944	5.540	0.287	19.55*	
468.00	0.974	6.020	0.371	15.63*	
468.50	1.005	6.514	0.411	14.56*	
469.00	1.036	7.025	0.444	13.92*	

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
469.50	1.068	7.551	0.472	13.48*	
470.00	1.100	8.093	0.795	8.25*	
470.50	1.128	8.650	0.942	7.15*	
471.00	1.157	9.221	1.059	6.52*	
471.50	1.186	9.807	1.160	6.11*	
472.00	1.216	10.407	1.251	5.81*	
472.50	1.300	11.036	1.334	5.70*	
473.00	1.276	11.680	1.411	5.52*	
473.50	1.306	12.325	1.484	5.40	
474.00	1.337	12.986	1.552	5.25	
474.50	1.368	13.662	1.617	5.20	
474.53	1.370	13.703	1.621	0.30	
474.75	1.384	14.006	1.649	2.25	
475.00	1.400	14.354	1.680	2.65	
475.17	1.407	14.600	4.287	7.25	Peak Stage
475.33	1.416	14.819	6.607		
475.50	1.425	15.060	7.756		
475.54	1.427	15.117	7.997		
475.75	1.437	15.418	9.138		
475.80	1.440	15.490	9.385		
476.00	1.450	15.779	10.306		
476.25	1.462	16.143	11.339		Spillway #1
476.50	1.475	16.510	12.274		
476.75	1.487	16.880	13.137		
476.95	1.497	17.179	17.112		Spillway #2
477.00	1.500	17.254	19.962		
477.50	1.550	18.016	48.891		
478.00	1.600	18.804	187.682		
478.50	1.650	19.616	341.764		
478.53	1.660	19.666	342.103		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
460.00	0.000	0.000	0.000
460.01	2.00>0.000	0.000	0.000
460.50	0.074	0.000	0.074
461.00	0.105	0.000	0.105
461.50	0.128	0.000	0.128
462.00	0.148	0.000	0.148
462.50	0.166	0.000	0.166
463.00	0.182	0.000	0.182
463.50	0.196	0.000	0.196
464.00	0.210	0.000	0.210
464.50	0.223	0.000	0.223
465.00	0.235	0.000	0.235
465.50	0.246	0.000	0.246
466.00	0.257	0.000	0.257
466.50	0.268	0.000	0.268
467.00	0.278	0.000	0.278
467.50	2.00>0.287	0.000	0.287
468.00	0.371	0.000	0.371
468.50	0.411	0.000	0.411
469.00	0.444	0.000	0.444
469.50	4.00>0.472	0.000	0.472
470.00	0.795	0.000	0.795
470.50	0.942	0.000	0.942
471.00	1.059	0.000	1.059
471.50	1.160	0.000	1.160
472.00	1.251	0.000	1.251
472.50	1.334	0.000	1.334
473.00	1.411	0.000	1.411
473.50	1.484	0.000	1.484
474.00	1.552	0.000	1.552
474.50	1.617	0.000	1.617
474.53	1.621	0.000	1.621
474.75	1.649	0.000	1.649
475.00	18.00>1.680	0.000	1.680
475.33	6.607	0.000	6.607
475.50	7.756	0.000	7.756
475.54	7.997	0.000	7.997
475.75	9.138	0.000	9.138
475.80	9.385	0.000	9.385
476.00	10.306	0.000	10.306

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
476.25	11.339	0.000	11.339
476.50	12.274	0.000	12.274
476.75	13.137	0.000	13.137
476.95	17.112	0.000	17.112
477.00	18.977	0.985	19.962
477.50	38.052	10.838	48.891
478.00	45.024	142.658	187.682
478.50	51.053	290.711	341.764
478.53	51.392	290.711	342.103

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	25 yr - 24 hr
Rainfall Depth:	5.520 inches

Pool EL. 468.50'

Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#13		0.770	0.770	1.73	0.13
#12		2.960	2.960	10.93	0.95
#10		9.050	9.050	29.89	2.45
#11		0.710	0.710	2.14	0.17
#9		14.140	14.140	22.14	2.57
#8		0.650	0.650	2.36	0.20
#5		12.990	12.990	17.18	2.36
#3		18.180	18.180	29.08	3.30
#2		5.060	23.240	38.45	4.34
#4		5.450	41.680	64.81	7.79
#6		1.530	58.710	88.50	11.09
#7	In	2.070	73.560	131.61	14.98
	Out			10.34	10.24

Initial Pool:	6.51 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Number of Holes per Elev
36.00	16.25	30.00	100.00	4.50	0.0240	476.25	1

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
476.95	20.00	4.00:1	4.00:1	60.00

Pond Results:

Peak Elevation:	476.01 ft
Dewater Time:	20.78 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
460.00	0.600	0.000	0.000		
460.01	0.600	0.006	0.000		Low hole SPW #1
460.50	0.602	0.300	0.074	48.46*	
461.00	0.604	0.602	0.105	34.90*	
461.50	0.606	0.904	0.128	28.54*	
462.00	0.608	1.208	0.148	24.78*	
462.50	0.638	1.519	0.166	22.74*	
463.00	0.669	1.846	0.182	21.76*	
463.50	0.701	2.189	0.196	21.12*	
464.00	0.733	2.547	0.210	20.67*	
464.50	0.766	2.922	0.223	20.37*	
465.00	0.900	3.338	0.235	21.45*	
465.50	0.828	3.770	0.246	21.23*	
466.00	0.856	4.191	0.257	19.81*	
466.50	0.885	4.626	0.268	19.68*	
467.00	0.914	5.076	0.278	19.59*	
467.50	0.944	5.540	0.287	19.55*	
468.00	0.974	6.020	0.371	15.63*	
468.50	1.005	6.514	0.411	14.56*	
469.00	1.036	7.025	0.444	13.92*	

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
469.50	1.068	7.551	0.472	13.48*	
470.00	1.100	8.093	0.795	8.25*	
470.50	1.128	8.650	0.942	7.15*	
471.00	1.157	9.221	1.059	6.52*	
471.50	1.186	9.807	1.160	6.11*	
472.00	1.216	10.407	1.251	5.81*	
472.50	1.300	11.036	1.334	5.70*	
473.00	1.276	11.680	1.411	5.52*	
473.50	1.306	12.325	1.484	5.40	
474.00	1.337	12.986	1.552	5.25	
474.50	1.368	13.662	1.617	5.20	
474.53	1.370	13.703	1.621	0.30	
474.75	1.384	14.006	1.649	2.25	
475.00	1.400	14.354	1.680	2.60	
475.33	1.416	14.819	6.607	5.95	
475.50	1.425	15.060	7.756	1.05	
475.54	1.427	15.117	7.997	0.20	
475.75	1.437	15.418	9.138	1.25	
475.80	1.440	15.490	9.385	0.30	
476.00	1.450	15.779	10.306	1.45	
476.01	1.450	15.791	10.340	0.30	Peak Stage
476.25	1.462	16.143	11.339		Spillway #1
476.50	1.475	16.510	12.274		
476.75	1.487	16.880	13.137		
476.95	1.497	17.179	17.112		Spillway #2
477.00	1.500	17.254	19.962		
477.50	1.550	18.016	48.891		
478.00	1.600	18.804	187.682		
478.50	1.650	19.616	341.764		
478.53	1.660	19.666	342.103		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
460.00	0.000	0.000	0.000
460.01	2.00>0.000	0.000	0.000
460.50	0.074	0.000	0.074
461.00	0.105	0.000	0.105
461.50	0.128	0.000	0.128
462.00	0.148	0.000	0.148
462.50	0.166	0.000	0.166
463.00	0.182	0.000	0.182
463.50	0.196	0.000	0.196
464.00	0.210	0.000	0.210
464.50	0.223	0.000	0.223
465.00	0.235	0.000	0.235
465.50	0.246	0.000	0.246
466.00	0.257	0.000	0.257
466.50	0.268	0.000	0.268
467.00	0.278	0.000	0.278
467.50	2.00>0.287	0.000	0.287
468.00	0.371	0.000	0.371
468.50	0.411	0.000	0.411
469.00	0.444	0.000	0.444
469.50	4.00>0.472	0.000	0.472
470.00	0.795	0.000	0.795
470.50	0.942	0.000	0.942
471.00	1.059	0.000	1.059
471.50	1.160	0.000	1.160
472.00	1.251	0.000	1.251
472.50	1.334	0.000	1.334
473.00	1.411	0.000	1.411
473.50	1.484	0.000	1.484
474.00	1.552	0.000	1.552
474.50	1.617	0.000	1.617
474.53	1.621	0.000	1.621
474.75	1.649	0.000	1.649
475.00	18.00>1.680	0.000	1.680
475.33	6.607	0.000	6.607
475.50	7.756	0.000	7.756
475.54	7.997	0.000	7.997
475.75	9.138	0.000	9.138
475.80	9.385	0.000	9.385
476.00	10.306	0.000	10.306

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
476.25	11.339	0.000	11.339
476.50	12.274	0.000	12.274
476.75	13.137	0.000	13.137
476.95	17.112	0.000	17.112
477.00	18.977	0.985	19.962
477.50	38.052	10.838	48.891
478.00	45.024	142.658	187.682
478.50	51.053	290.711	341.764
478.53	51.392	290.711	342.103

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	100 yr - 24 hr
Rainfall Depth:	7.440 inches

Pool @ EL. 468.50'

Structure Summary:

		Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#13		0.770	0.770	2.85	0.22
#12		2.960	2.960	15.50	1.40
#10		9.050	9.050	43.96	3.76
#11		0.710	0.710	3.24	0.27
#9		14.140	14.140	33.70	3.94
#8		0.650	0.650	3.37	0.30
#5		12.990	12.990	26.30	3.62
#3		18.180	18.180	44.22	5.06
#2		5.060	23.240	58.26	6.61
#4		5.450	41.680	98.32	11.86
#6		1.530	58.710	134.55	16.94
#7	In	2.070	73.560	199.97	22.93
	Out			49.88	18.14

Initial Pool:	6.51 ac-ft

Perforated Riser

Riser Diameter (in)	Riser Height (ft)	Barrel Diameter (in)	Barrel Length (ft)	Barrel Slope (%)	Manning's n	Spillway Elev (ft)	Number of Holes per Elev
36.00	16.25	30.00	100.00	4.50	0.0240	476.25	1

Emergency Spillway

Spillway Elev	Crest Length (ft)	Left Sideslope	Right Sideslope	Bottom Width (ft)
476.95	20.00	4.00:1	4.00:1	60.00

Pond Results:

Peak Elevation:	477.50 ft
Dewater Time:	20.88 days

Dewatering time is calculated from peak stage to lowest spillway

Elevation-Capacity-Discharge Table

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
460.00	0.600	0.000	0.000		
460.01	0.600	0.006	0.000		Low hole SPW #1
460.50	0.602	0.300	0.074	48.46*	
461.00	0.604	0.602	0.105	34.90*	
461.50	0.606	0.904	0.128	28.54*	
462.00	0.608	1.208	0.148	24.78*	
462.50	0.638	1.519	0.166	22.74*	
463.00	0.669	1.846	0.182	21.76*	
463.50	0.701	2.189	0.196	21.12*	
464.00	0.733	2.547	0.210	20.67*	
464.50	0.766	2.922	0.223	20.37*	
465.00	0.900	3.338	0.235	21.45*	
465.50	0.828	3.770	0.246	21.23*	
466.00	0.856	4.191	0.257	19.81*	
466.50	0.885	4.626	0.268	19.68*	
467.00	0.914	5.076	0.278	19.59*	
467.50	0.944	5.540	0.287	19.55*	
468.00	0.974	6.020	0.371	15.63*	
468.50	1.005	6.514	0.411	14.56*	
469.00	1.036	7.025	0.444	13.92*	

Elevation	Area (ac)	Capacity (ac-ft)	Discharge (cfs)	Dewater Time (hrs)	
469.50	1.068	7.551	0.472	13.48*	
470.00	1.100	8.093	0.795	8.25*	
470.50	1.128	8.650	0.942	7.15*	
471.00	1.157	9.221	1.059	6.52*	
471.50	1.186	9.807	1.160	6.11*	
472.00	1.216	10.407	1.251	5.81*	
472.50	1.300	11.036	1.334	5.70*	
473.00	1.276	11.680	1.411	5.52*	
473.50	1.306	12.325	1.484	5.40	
474.00	1.337	12.986	1.552	5.25	
474.50	1.368	13.662	1.617	5.20	
474.53	1.370	13.703	1.621	0.30	
474.75	1.384	14.006	1.649	2.25	
475.00	1.400	14.354	1.680	2.55	
475.33	1.416	14.819	6.607	3.25	
475.50	1.425	15.060	7.756	1.10	
475.54	1.427	15.117	7.997	0.25	
475.75	1.437	15.418	9.138	0.95	
475.80	1.440	15.490	9.385	0.20	
476.00	1.450	15.779	10.306	0.85	
476.25	1.462	16.143	11.339	0.95	Spillway #1
476.50	1.475	16.510	12.274	1.05	
476.75	1.487	16.880	13.137	1.20	
476.95	1.497	17.179	17.112	1.20	Spillway #2
477.00	1.500	17.254	19.962	0.30	
477.50	1.550	18.016	48.891	1.60	
477.50	1.550	18.022	49.879	0.05	Peak Stage
478.00	1.600	18.804	187.682		
478.50	1.650	19.616	341.764		
478.53	1.660	19.666	342.103		

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

Detailed Discharge Table

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
460.00	0.000	0.000	0.000
460.01	2.00>0.000	0.000	0.000
460.50	0.074	0.000	0.074
461.00	0.105	0.000	0.105
461.50	0.128	0.000	0.128
462.00	0.148	0.000	0.148
462.50	0.166	0.000	0.166
463.00	0.182	0.000	0.182
463.50	0.196	0.000	0.196
464.00	0.210	0.000	0.210
464.50	0.223	0.000	0.223
465.00	0.235	0.000	0.235
465.50	0.246	0.000	0.246
466.00	0.257	0.000	0.257
466.50	0.268	0.000	0.268
467.00	0.278	0.000	0.278
467.50	2.00>0.287	0.000	0.287
468.00	0.371	0.000	0.371
468.50	0.411	0.000	0.411
469.00	0.444	0.000	0.444
469.50	4.00>0.472	0.000	0.472
470.00	0.795	0.000	0.795
470.50	0.942	0.000	0.942
471.00	1.059	0.000	1.059
471.50	1.160	0.000	1.160
472.00	1.251	0.000	1.251
472.50	1.334	0.000	1.334
473.00	1.411	0.000	1.411
473.50	1.484	0.000	1.484
474.00	1.552	0.000	1.552
474.50	1.617	0.000	1.617
474.53	1.621	0.000	1.621
474.75	1.649	0.000	1.649
475.00	18.00>1.680	0.000	1.680
475.33	6.607	0.000	6.607
475.50	7.756	0.000	7.756
475.54	7.997	0.000	7.997
475.75	9.138	0.000	9.138
475.80	9.385	0.000	9.385
476.00	10.306	0.000	10.306

Elevation (ft)	Perf. Riser (cfs)	Emergency Spillway (cfs)	Combined Total Discharge (cfs)
476.25	11.339	0.000	11.339
476.50	12.274	0.000	12.274
476.75	13.137	0.000	13.137
476.95	17.112	0.000	17.112
477.00	18.977	0.985	19.962
477.50	38.052	10.838	48.891
478.00	45.024	142.658	187.682
478.50	51.053	290.711	341.764
478.53	51.392	290.711	342.103

SECTION 10

Appendix J

Stormwater Channels

Appendix J

Stormwater Channels

APPENDIX J

STORMWATER CHANNELS

CHANNEL DESIGN

All permanent channels were designed using the peak discharge from the contributing drainage area for the 25-year/24-hour storm event under post-development conditions. The channel designs are shown on the SEDCAD printouts. In addition, the perimeter conveyance system to each proposed basin was designed to ensure conveyance of the 100-year/24-hour event to each basin. The existing conveyance system consists of Channels A thru C, E, G, H, K thru Q, S, Berm Swale, DIV#1 and DS-1 thru DS-4. **The Northern Realignment requires Channel N to be reviewed for adequacy and adds Channels AA, BB, CC, DS-8 and DS-9.**

Bench Capacity

The proposed modifications do not change the design of the landfill benches.

Channel A Capacity

Existing (no changes)

Proposed Channel A lies within the Basin #4 drainage shed. The channel conveys runoff from the landfill face to Basin #4 along the access road. Channel A extends from Inlet #2 to Inlet #1 and the drainage area to Channel A was determined to be 2.2 acres. The drainage area analysis was completed within the Basin 4 design in which a 100-year peak discharge rate was determined to be 10.03 cfs. The channel was analyzed using an average slope of 5% and 2%.

Channel B Capacity

Existing (no changes)

Proposed Channel B lies within the Basin #6 drainage shed. The channel conveys runoff from the landfill face to Basin 6 along the access road. Channel B extends from Inlet #3 to Inlet #2 and the drainage area to Channel B was determined to be 0.7 acres. The drainage area analysis

was completed within the Basin 6 design in which a 100-year peak discharge rate was determined to be 3.8 cfs. The channel was analyzed using an average slope of 5.0%.

Channel C Capacity

Existing (no changes)

Channel C lies within the Basin #6 drainage shed. The channel conveys runoff from the landfill face to Basin 6 along the access road. Channel C extends from Culvert 16 to Inlet #3 and the drainage area to Channel C was determined to be 11.6 acres. The drainage area analysis was completed within the Basin 6 design in which a 100-year peak discharge rate was determined to be 52.8 cfs. The channel was analyzed using an average slope of 5% and 20%.

Channel D Capacity

Existing Channel D was eliminated during the construction of Cell 4F.

Channel E Capacity

A section of Channel E was removed during the construction of Cell 4F. (No Changes)

The remaining section will be directed to Inlet 14 / Sediment Trap A. Existing Channel E lies within the Sediment Trap A drainage shed consisting of approximately 4.0 acres. The channel conveys runoff from the landfill face to Sediment Trap A along the access road. The drainage area analysis was completed for Sediment Trap A, in which a 100-year peak discharge rate was determined to be 10.3 cfs. The channel was analyzed using an average slope of 1.5%.

Channel G Capacity

Existing (no changes)

Proposed Channel G lies within the proposed Basin #3 drainage shed. The channel conveys runoff from the landfill access road to Basin #3 along the toe of the access road berm. The drainage area to Channel G was determined to be 0.25 acres. The drainage area analysis was completed within the Basin 3 design in which a 100-year peak discharge rate was determined to be 1.24 cfs. The channel was analyzed using an average slope of 2.9%.

Channel H Capacity

Existing (no changes)

Proposed Channel H lies within the Basin #3 drainage shed. The channel conveys runoff from the landfill access road to Basin #3 along the toe of the access road berm. The drainage area to Channel H was determined to be 0.6 acres. The drainage area analysis was completed within the Basin #3 design in which a 100-year peak discharge rate was determined to be 2.98 cfs. The channel was analyzed using an average slope of 1.0%.

Channel K Capacity

Existing (no changes)

Proposed Channel K lies within the Basin 6 drainage shed. The channel conveys runoff from culvert C-2 to the Landfill discharge point at Wetland A. The total 100-year peak discharge rate is that of the combined Basin 6 & 7 discharge of 33.9 cfs. The channel was analyzed using an average slope of 4.00%.

Channel L Capacity

Eliminated - Northern Realignment

Channel L was eliminated during the design of the Northern Realignment.

Channel M Capacity

Existing (no changes)

Proposed Channel M lies within the Basin #2 drainage shed. The channel conveys runoff from the southern face of the landfill from the eastern slope to I-16 along the access drive. The drainage area to Channel M was determined to be 2.96 acres. The drainage area analysis was completed within the Basin #2 analysis in which a peak 100-year discharge rate was determined to be 15.50 cfs. The channel was analyzed using average slopes between 2.3% and 11.8%.

Channel N Capacity

Northern Realignment - Channel Redesigned

Proposed Channel N lies within the Basin #2 drainage shed. The channel conveys runoff from C-23 along the fill slope. The drainage to Channel N was determined to be 58.7 acres. The drainage analysis was completed within the Basin #2 analysis in which a peak 100-year discharge rate was determined to be 134.55 cfs. The channel was designed with an average slope of 16.7% and 24.3%.

Channel O Capacity

Eliminated - Northern Realignment

Channel O was eliminated during the design of the Northern Realignment.

Channel P Capacity

Eliminated - Northern Realignment

Channel P was eliminated during the design of the Northern Realignment.

Channel Q Capacity

Eliminated - Northern Realignment

Channel Q was eliminated during the design of the Northern Realignment.

Channel S Capacity

Existing (No Changes)

MSE Berm Channels Capacity

Existing (no changes)

The Berm Channel is located along the top of the MSE Berm at the north edge of the disposal area. This channel directs runoff to Inlets 10, 11, & 12 and Channel C.

The design of the Berm Channels was based on the 100-year 24-hour storm event. The Berm Channel design is based on the largest tributary area to the Berm Channel, the calculated flow depth of the flattest channel (1%) and the velocity/lining of the steepest channel (10.8%).

Channel U Capacity

Existing (no changes)

Channel U lies within the Basin #2 drainage shed. The Channel conveys runoff from the landfill face extending from Channel DS-5 to Channel O. Channel U was originally designed as part of the 2013 Grading Adjustment Modification. The Southeastern Realignment revision required the existing Channel to be reanalyzed for adequacy. The tributary area for Channel U was determined to be 8.0 acres having a peak discharge of 14.02 cfs for the 25-year storm event.

Channel V Capacity

Existing (no changes)

Channel V lies within the Basin #1 drainage shed. The channel conveys runoff from the landfill face to an existing perimeter channel along the access road. The drainage area to Channel V was determined to be 0.6 acres. The drainage area analysis was completed within the SEDCAD computer program in which a peak 100-year rate was determined to be 1.81 cfs. The channel was analyzed using slopes of 0.8%, 3.0% and 10%.

Channel W Capacity

Eliminated - Northern Realignment

Channel W was eliminated during the design of the Northern Realignment.

Channel X Capacity

Eliminated - Northern Realignment

Channel X was eliminated during the design of the Northern Realignment.

Channel Y Capacity

Eliminated - Northern Realignment

Channel Y was eliminated during the design of the Northern Realignment.

Channel Z Capacity

Existing (no changes)

Channel Z lies within the Basin #2 drainage shed. The channel is proposed to collect runoff from the eastern landfill slope. Channel Z extends from I-15 to Channel N. The drainage area to Channel Z was determined to be 0.72 acres. The drainage area analysis was completed within the Basin #2 analysis in which a 100-year peak discharge was calculated to be 3.24 cfs. Channels Z was analyzed using an average slopes between 1.5% and 9.5%.

Channel AA Capacity

Northern Realignment – New Channel

Channel AA lies within the Basin #2 drainage shed. The channel is proposed to collect runoff from the northeastern landfill slope. Channel AA collects a portion of the eastern perimeter of the landfill slope and empties into C-17. The drainage area to Channel AA was determined to be 0.65 acres. The drainage area analysis was completed within the Basin #2 analysis in which a 100-year peak discharge was calculated to be 3.37 cfs. Channel AA was analyzed using an average slope of 4.4%. The channel design is shown on the attached SEDCAD printout and on the plan sheets.

Channel BB Capacity

Northern Realignment – New Channel

Channel BB lies within the Basin #2 drainage shed. The channel is proposed to collect runoff from the northern landfill slope. Channel BB extends from DS-9 to C-17. The drainage area to Channel BB was determined to be 41.68 acres. The drainage area analysis was completed within the Basin #2 analysis in which a 100-year peak discharge was calculated to be 98.32 cfs. Channel BB was analyzed using an average slope of 0.5%. The channel design is shown on the attached SEDCAD printout and on the plan sheets.

Channel CC Capacity

Northern Realignment – New Channel

Channel CC lies within the Basin #2 drainage shed. The channel is proposed to collect runoff from the eastern landfill slope. Channel CC extends from DS-8 to DS-9. The drainage area to Channel CC was determined to be 23.24 acres. The drainage area analysis was completed within the Basin #2 analysis in which a 100-year peak discharge was calculated to be 58.26 cfs. Channel CC was analyzed using an average slope of 0.5%. The channel design is shown on the attached SEDCAD printout and on the plan sheets.

Channels DS-1 to DS-5

Existing (No Changes)

Existing Channels DS-1 to DS-5 design shall remain the same as previously approved without change except DS-3 shall be extended as depicted on the plans for the Southeastern Realignment.

Channel DS-6 Capacity

Existing (No Changes)

Channel DS-6 lies within the Basin #2 drainage shed. The channel conveys runoff from the landfill face via benches to I-16 down the slope of the landfill. The tributary area to DS-6 was determined to be 9.05 acres. The drainage area analysis was completed within the Basin #2 design in which a peak 100-year discharge rate of 43.96 cfs was calculated. The channel was analyzed using an average slope of 28%.

Channel DS-7 Capacity

Northern Realignment - Channel Redesigned

Proposed Channel DS-7 lies within the Basin #2 drainage shed. The channel conveys runoff from the landfill face via benches to I-15 down the slope of the landfill. The tributary area to DS-7 was determined to be 14.14 acres. The drainage area analysis was completed within the Basin #2 design in which a peak 100-year discharge rate of 33.70 cfs was calculated. The

channel was analyzed using an average slope of 20%. The channel is shown on the attached SEDCAD printouts and on the plan sheets.

Channel DS-8 Capacity

Northern Realignment – New Channel

Proposed Channel DS-8 lies within the Basin #2 drainage shed. The channel conveys runoff from the landfill face via benches to proposed Channel CC. The tributary area to DS-8 was determined to be 18.18 acres. The drainage area analysis was completed within the Basin #2 design in which a peak 100-year discharge rate of 44.22 cfs was calculated. The channel was analyzed using an average slope of 28%. The channel is shown on the attached SEDCAD printouts and on the plan sheets.

Channel DS-9 Capacity

Northern Realignment – New Channel

Proposed Channel DS-9 lies within the Basin #2 drainage shed. The channel conveys runoff from the landfill face via benches to proposed Channel BB. The tributary area to DS-9 was determined to be 12.99 acres. The drainage area analysis was completed within the Basin #2 design in which a peak 100-year discharge rate of 26.30 cfs was calculated. The channel was analyzed using an average slope of 28%. The channel is shown on the attached SEDCAD printouts and on the plan sheets.

Channel AA @ 4.4%

Material: Riprap

Trapezoidal Channel

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
2.00	2.0:1	2.0:1	4.4	1.00		

PADER Method - Steep Slope Design

	w/o Freeboard	w/ Freeboard
Design Discharge:	3.37 cfs	
Depth:	0.35 ft	1.35 ft
Top Width:	3.40 ft	7.40 ft
Velocity:	3.58 fps	
X-Section Area:	0.94 sq ft	
Hydraulic Radius:	0.264 ft	
Froude Number:	1.20	
Manning's n:	0.0360	
Dmin:	1.00 in	
D50:	1.50 in	
Dmax:	3.00 in	

Channel BB @ 0.5%

Material: Riprap

Trapezoidal Channel

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
2.00	2.0:1	2.0:1	0.5	1.00		

PADER Method - Mild Slope Design

	w/o Freeboard	w/ Freeboard
Design Discharge:	98.32 cfs	
Depth:	2.82 ft	3.82 ft
Top Width:	13.29 ft	17.29 ft
Velocity:	4.55 fps	
X-Section Area:	21.59 sq ft	
Hydraulic Radius:	1.476 ft	
Froude Number:	0.63	
Manning's n:	0.0300	
Dmin:	2.00 in	
D50:	3.00 in	
Dmax:	4.50 in	

Channel CC @ 0.5%

Material: Riprap

Trapezoidal Channel

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
2.00	2.0:1	2.0:1	0.5	1.00		

PADER Method - Mild Slope Design

	w/o Freeboard	w/ Freeboard
Design Discharge:	58.26 cfs	
Depth:	2.21 ft	3.21 ft
Top Width:	10.86 ft	14.86 ft
Velocity:	4.09 fps	
X-Section Area:	14.23 sq ft	
Hydraulic Radius:	1.196 ft	
Froude Number:	0.63	
Manning's n:	0.0290	
Dmin:	1.00 in	
D50:	1.50 in	
Dmax:	3.00 in	

DS-7 @ 20%

Material: Riprap

Trapezoidal Channel

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
8.00	0.0:1	0.0:1	20.0	1.00		

PADER Method - Steep Slope Design

	w/o Freeboard	w/ Freeboard
Design Discharge:	33.70 cfs	
Depth:	0.59 ft	1.59 ft
Top Width:	8.01 ft	8.03 ft
Velocity:	7.13 fps	
X-Section Area:	4.72 sq ft	
Hydraulic Radius:	0.515 ft	
Froude Number:	1.64	
Manning's n:	0.0600	
Dmin:	3.00 in	
D50:	6.00 in	
Dmax:	9.00 in	

DS 8 @28%

Material: Riprap

Trapezoidal Channel

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
8.00	0.0:1	0.0:1	28.0	1.00		

PADER Method - Steep Slope Design

	w/o Freeboard	w/ Freeboard
Design Discharge:	44.22 cfs	
Depth:	0.62 ft	1.62 ft
Top Width:	8.01 ft	8.03 ft
Velocity:	8.86 fps	
X-Section Area:	4.99 sq ft	
Hydraulic Radius:	0.540 ft	
Froude Number:	1.98	
Manning's n:	0.0590	
Dmin:	3.00 in	
D50:	6.00 in	
Dmax:	9.00 in	

DS-9 @ 28%

Material: Riprap

Trapezoidal Channel

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
8.00	0.0:1	0.0:1	28.0	1.00		

PADER Method - Steep Slope Design

	w/o Freeboard	w/ Freeboard
Design Discharge:	26.30 cfs	
Depth:	0.48 ft	1.48 ft
Top Width:	8.01 ft	8.03 ft
Velocity:	6.81 fps	
X-Section Area:	3.86 sq ft	
Hydraulic Radius:	0.431 ft	
Froude Number:	1.73	
Manning's n:	0.0660	
Dmin:	3.00 in	
D50:	6.00 in	
Dmax:	9.00 in	

Channel N @ 24.3%

Material: Riprap

Trapezoidal Channel

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
2.00	2.0:1	2.0:1	24.3	1.00		

PADER Method - Steep Slope Design

	w/o Freeboard	w/ Freeboard
Design Discharge:	134.55 cfs	
Depth:	1.83 ft	2.83 ft
Top Width:	9.31 ft	13.31 ft
Velocity:	13.02 fps	
X-Section Area:	10.33 sq ft	
Hydraulic Radius:	1.016 ft	
Froude Number:	2.18	
Manning's n:	0.0570	
Dmin:	12.00 in	
D50:	15.00 in	
Dmax:	24.00 in	

Channel N @ 16.7%

Material: Riprap

Trapezoidal Channel

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)
2.00	2.0:1	2.0:1	16.7	1.00		

PADER Method - Steep Slope Design

	w/o Freeboard	w/ Freeboard
Design Discharge:	134.55 cfs	
Depth:	1.96 ft	2.96 ft
Top Width:	9.83 ft	13.83 ft
Velocity:	11.63 fps	
X-Section Area:	11.57 sq ft	
Hydraulic Radius:	1.076 ft	
Froude Number:	1.89	
Manning's n:	0.0550	
Dmin:	7.00 in	
D50:	12.00 in	
Dmax:	18.00 in	

SECTION 10

Appendix K

Stormwater Culverts

Appendix K

Stormwater Culverts

APPENDIX K

STORMWATER CULVERTS

CULVERT DESIGN

All permanent culverts were designed using the peak discharge from the maximum contributing drainage area for the 100-year/24-hour storm event under post-development conditions. The culverts were designed as described below utilizing the SEDCAD computer program. In addition, the conveyance system to each proposed basin was designed to ensure conveyance of the 100-year/24-hour event to each basin. Culverts C-1 thru C-26 shall be part of the conveyance system.

Culverts C-1 thru C-10, C-13 thru C16, C-18 thru C-20, C-24, and C-26

EXISTING – no change

Culvert C-17

Culvert 17 is to be redesigned as part of the Northern Realignment. Culvert C-17 will be installed to convey the discharge from Channels AA and BB to Stormwater Manhole #3. The peak discharge from the 100-year/24-hour storm event was calculated to be 101.69 cfs or the total flow from Channels AA and BB combined. One culvert will be installed to adequately pass 101.69 cfs. The SEDCAD output is attached and the sizing of the culverts is as follows:

Design Discharge	101.69 cfs
Pipe Length	327 FT
Pipe Slope	1% and 0.86%
Manning's n	0.012
Maximum Headwater	6.0 FT
Proposed Pipe Diameter	48 inches

Culvert 21 & 21A

Eliminated during the design of the Northern Realignment.

Culvert C-22

Culvert C-22 is to be redesigned as part of the Northern Realignment. Culvert C-22 will be installed to convey the discharge from I-15 to Stormwater Manhole #3. The peak discharge from the 100-year/24-hour storm event, 33.70 cfs, was calculated during the Basin #2 analysis and is defined as the DS-7 drainage area. One culvert will be installed to adequately pass 33.70 cfs. The SEDCAD output is attached and the sizing of the culverts is as follows:

Design Discharge	33.70 cfs
Pipe Length	71 FT
Pipe Slope	7.04 %
Manning's n	0.012
Maximum Headwater	6.5 FT
Proposed Pipe Diameter	24 inches

Culvert C-23

Culvert C-23 is to be redesigned as part of the Northern Realignment. Culvert C-23 will be installed to convey the discharge from Stormwater Manhole #3 to Channel N. The peak discharge from the 100-year/24-hour storm event was calculated during the Basin #2 analysis combining the peak flow from Culverts C-17 and C-22 and is 135.39 cfs. One culvert will be installed to adequately pass 135.39 cfs. The output is attached and the sizing of the culverts is as follows:

Design Discharge	135.39 cfs
Pipe Length	620 FT
Pipe Slope	7.62%, 1.52% and 1.40%
Manning's n	0.012
Maximum Headwater	13.38 FT
Proposed Pipe Diameter	54 inches

Culvert C-25

Culvert C-25 is to be redesigned as part of the Northern Realignment. Culvert C-25 will be installed to convey the discharge from Channel N and the Channel N drainage area to Basin #2. The peak discharge from the 100-year/24-hour storm event was calculated during the Basin #2 analysis by combining the discharge of Culvert 23 with that of the Channel N drainage area, resulting in a design discharge of 142.25 cfs. One culvert will be installed to adequately pass 142.25 cfs. The output is attached and the sizing of the culverts is as follows:

Design Discharge	142.25 cfs
Pipe Length	184 FT
Pipe Slope	2.50%, 6.65%, 18.3%
Manning's n	0.012
Maximum Headwater	7.0 FT
Proposed Pipe Diameter	54 inches

APRON DESIGN

Riprap aprons have been designed for construction within the Northern Realignment to dissipate energy and prevent scour problems. The aprons have been designed as outlined below for culvert outlets within the Northern Realignment.

Culvert C-23 Apron

The flow from Culvert C-23 for the 100-year/24-hour storm event is 135.39 cfs with a proposed diameter of 54 inches. The width of the outfall is designed to conform to Channel "N".

Using Figure 9.3 of Reference #2, the following design can be determined:

Length of Apron	28 FT
Width of Apron	Width to conform to Channel "N"
D_{50} (Riprap)	R-6
Riprap Thickness	36 inches

Culvert C-25 Apron

The flow from Culvert C-25 for the 100-year/24-hour storm event is 142.25 cfs with a proposed diameter of 54 inches.

Using Figure 9.3 of Reference #2, the following design can be determined:

Length of Apron	28 FT
Width of Apron	38 FT
D_{50} (Riprap)	R-6
Riprap Thickness	36 inches

Culvert C-17 @ 1.00%

Culvert Inputs:

Length (ft)	Slope (%)	Manning's n	Max. Headwater (ft)	Tailwater (ft)	Entrance Loss Coef. (Ke)
287.00	1.00	0.0120	6.00	0.00	0.50

Culvert Results:

Minimum pipe diameter: 1 - 48 inch pipe(s) required

Detailed Performance Curves

Design Discharge = 101.69 cfs

Maximum Headwater = 6.00 ft

(BOLD indicates design pipe size)

Headwater (ft)	Discharge (cfs) (45 in)	**Discharge (cfs) (48 in)**	Discharge (cfs) (54 in)
0.60	3.65	**3.90**	4.38
1.20	10.32	**11.01**	12.39
1.80	18.96	**20.23**	22.76
2.40	29.20	**31.14**	35.04
3.00	40.80	**43.52**	48.96
3.60	53.64	**57.21**	64.36
4.20	67.59	**72.09**	81.10
4.80	79.63	**87.36**	99.09
5.40	90.29	**99.25**	116.42
6.00	99.82	**110.44**	131.44
6.60	108.52	**120.59**	145.04
7.20	116.57	**129.95**	157.45
7.80	124.10	**138.67**	168.97
8.40	131.18	**146.88**	179.75
9.00	137.91	**154.67**	189.91

Culvert C-17 @ 0.86%

Culvert Inputs:

Length (ft)	Slope (%)	Manning's n	Max. Headwater (ft)	Tailwater (ft)	Entrance Loss Coef. (Ke)
36.00	0.86	0.0120	6.00	0.00	0.50

Culvert Results:

Minimum pipe diameter: 1 - 48 inch pipe(s) required

Detailed Performance Curves

Design Discharge = 101.69 cfs

Maximum Headwater = 6.00 ft

(BOLD indicates design pipe size)

Headwater (ft)	Discharge (cfs) (45 in)	**Discharge (cfs) (48 in)**	Discharge (cfs) (54 in)
0.60	3.65	**3.90**	4.38
1.20	10.32	**11.01**	12.39
1.80	18.96	**20.23**	22.76
2.40	29.20	**31.14**	35.04
3.00	40.80	**43.52**	48.96
3.60	53.64	**57.21**	64.36
4.20	67.59	**72.09**	81.10
4.80	79.63	**87.36**	99.09
5.40	90.29	**99.25**	116.42
6.00	99.82	**110.44**	131.44
6.60	108.52	**120.59**	145.04
7.20	116.57	**129.95**	157.45
7.80	124.10	**138.67**	168.97
8.40	131.18	**146.88**	179.75
9.00	137.91	**154.67**	189.91

Culvert C-22 @ 7.04%

Culvert Inputs:

Length (ft)	Slope (%)	Manning's n	Max. Headwater (ft)	Tailwater (ft)	Entrance Loss Coef. (Ke)
71.00	7.04	0.0120	6.50	0.00	0.50

Culvert Results:

Minimum pipe diameter: 1 - 24 inch pipe(s) required

Detailed Performance Curves

Design Discharge = 33.70 cfs

Maximum Headwater = 6.50 ft

(BOLD indicates design pipe size)

Headwater (ft)	Discharge (cfs) (21 in)	**Discharge (cfs) (24 in)**	Discharge (cfs) (30 in)
0.65	1.93	**2.20**	2.75
1.30	5.43	**6.21**	7.76
1.95	9.98	**11.41**	14.26
2.60	13.85	**16.83**	21.95
3.25	16.88	**21.03**	29.39
3.90	19.44	**24.50**	35.38
4.55	21.70	**27.55**	40.49
5.20	23.74	**30.30**	45.02
5.85	25.63	**32.81**	49.14
6.50	27.38	**35.15**	52.94
7.15	29.03	**37.34**	56.49
7.80	30.59	**39.41**	59.82
8.45	32.09	**41.37**	62.97
9.10	33.50	**43.25**	65.99
9.75	34.86	**45.05**	68.86

Culvert 23 @ 7.62%

Culvert Inputs:

Length (ft)	Slope (%)	Manning's n	Max. Headwater (ft)	Tailwater (ft)	Entrance Loss Coef. (Ke)
264.00	7.62	0.0120	6.50	0.00	0.50

Culvert Results:

Minimum pipe diameter: 1 - 54 inch pipe(s) required

Detailed Performance Curves

Design Discharge = 135.39 cfs

Maximum Headwater = 6.50 ft

(BOLD indicates design pipe size)

Headwater (ft)	Discharge (cfs) (48 in)	**Discharge (cfs) (54 in)**	Discharge (cfs) (60 in)
0.65	4.39	**4.94**	5.49
1.30	12.42	**13.97**	15.52
1.95	22.81	**25.66**	28.51
2.60	35.12	**39.50**	43.89
3.25	49.07	**55.21**	61.34
3.90	64.51	**72.57**	80.63
4.55	81.29	**91.45**	101.61
5.20	95.23	**111.73**	124.14
5.85	107.75	**127.82**	148.13
6.50	118.96	**142.86**	166.35
7.15	129.20	**156.45**	184.07
7.80	138.68	**168.98**	200.20
8.45	147.54	**180.61**	215.14
9.10	155.92	**191.54**	229.11
9.75	163.88	**201.89**	242.26

Culvert 23 @ 1.52%

Culvert Inputs:

Length (ft)	Slope (%)	Manning's n	Max. Headwater (ft)	Tailwater (ft)	Entrance Loss Coef. (Ke)
256.00	1.52	0.0120	6.50	0.00	0.50

Culvert Results:

Minimum pipe diameter: 1 - 54 inch pipe(s) required

Detailed Performance Curves

Design Discharge = 135.39 cfs

Maximum Headwater = 6.50 ft

(BOLD indicates design pipe size)

Headwater (ft)	Discharge (cfs) (48 in)	**Discharge (cfs) (54 in)**	Discharge (cfs) (60 in)
0.65	4.39	**4.94**	5.49
1.30	12.42	**13.97**	15.52
1.95	22.81	**25.66**	28.51
2.60	35.12	**39.50**	43.89
3.25	49.07	**55.21**	61.34
3.90	64.51	**72.57**	80.63
4.55	81.29	**91.45**	101.61
5.20	95.23	**111.73**	124.14
5.85	107.75	**127.82**	148.13
6.50	118.96	**142.86**	166.35
7.15	129.20	**156.45**	184.07
7.80	138.68	**168.98**	200.20
8.45	147.54	**180.61**	215.14
9.10	155.92	**191.54**	229.11
9.75	163.88	**201.89**	242.26

Culvert 23 @ 1.40%

Culvert Inputs:

Length (ft)	Slope (%)	Manning's n	Max. Headwater (ft)	Tailwater (ft)	Entrance Loss Coef. (Ke)
100.00	1.40	0.0120	6.50	0.00	0.50

Culvert Results:

Minimum pipe diameter: 1 - 54 inch pipe(s) required

Detailed Performance Curves

Design Discharge = 135.39 cfs

Maximum Headwater = 6.50 ft

(BOLD indicates design pipe size)

Headwater (ft)	Discharge (cfs) (48 in)	**Discharge (cfs) (54 in)**	Discharge (cfs) (60 in)
0.65	4.39	**4.94**	5.49
1.30	12.42	**13.97**	15.52
1.95	22.81	**25.66**	28.51
2.60	35.12	**39.50**	43.89
3.25	49.07	**55.21**	61.34
3.90	64.51	**72.57**	80.63
4.55	81.29	**91.45**	101.61
5.20	95.23	**111.73**	124.14
5.85	107.75	**127.82**	148.13
6.50	118.96	**142.86**	166.35
7.15	129.20	**156.45**	184.07
7.80	138.68	**168.98**	200.20
8.45	147.54	**180.61**	215.14
9.10	155.92	**191.54**	229.11
9.75	163.88	**201.89**	242.26

Culvert 25 @ 18.30%

Culvert Inputs:

Length (ft)	Slope (%)	Manning's n	Max. Headwater (ft)	Tailwater (ft)	Entrance Loss Coef. (Ke)
30.00	18.30	0.0120	6.50	0.00	0.50

Culvert Results:

Minimum pipe diameter: 1 - 54 inch pipe(s) required

Detailed Performance Curves

Design Discharge = 142.25 cfs

Maximum Headwater = 6.50 ft

(BOLD indicates design pipe size)

Headwater (ft)	Discharge (cfs) (48 in)	**Discharge (cfs) (54 in)**	Discharge (cfs) (60 in)
0.65	4.39	**4.94**	5.49
1.30	12.42	**13.97**	15.52
1.95	22.81	**25.66**	28.51
2.60	35.12	**39.50**	43.89
3.25	49.07	**55.21**	61.34
3.90	64.51	**72.57**	80.63
4.55	81.29	**91.45**	101.61
5.20	95.23	**111.73**	124.14
5.85	107.75	**127.82**	148.13
6.50	118.96	**142.86**	166.35
7.15	129.20	**156.45**	184.07
7.80	138.68	**168.98**	200.20
8.45	147.54	**180.61**	215.14
9.10	155.92	**191.54**	229.11
9.75	163.88	**201.89**	242.26

Culvert 25 @ 6.65%

Culvert Inputs:

Length (ft)	Slope (%)	Manning's n	Max. Headwater (ft)	Tailwater (ft)	Entrance Loss Coef. (Ke)
124.00	6.65	0.0120	6.50	0.00	0.50

Culvert Results:

Minimum pipe diameter: 1 - 54 inch pipe(s) required

Detailed Performance Curves

Design Discharge = 142.25 cfs

Maximum Headwater = 6.50 ft

(BOLD indicates design pipe size)

Headwater (ft)	Discharge (cfs) (48 in)	**Discharge (cfs) (54 in)**	Discharge (cfs) (60 in)
0.65	4.39	**4.94**	5.49
1.30	12.42	**13.97**	15.52
1.95	22.81	**25.66**	28.51
2.60	35.12	**39.50**	43.89
3.25	49.07	**55.21**	61.34
3.90	64.51	**72.57**	80.63
4.55	81.29	**91.45**	101.61
5.20	95.23	**111.73**	124.14
5.85	107.75	**127.82**	148.13
6.50	118.96	**142.86**	166.35
7.15	129.20	**156.45**	184.07
7.80	138.68	**168.98**	200.20
8.45	147.54	**180.61**	215.14
9.10	155.92	**191.54**	229.11
9.75	163.88	**201.89**	242.26

Culvert 25 @ 2.50%

Culvert Inputs:

Length (ft)	Slope (%)	Manning's n	Max. Headwater (ft)	Tailwater (ft)	Entrance Loss Coef. (Ke)
30.00	2.50	0.0120	6.50	0.00	0.50

Culvert Results:

Minimum pipe diameter: 1 - 54 inch pipe(s) required

Detailed Performance Curves

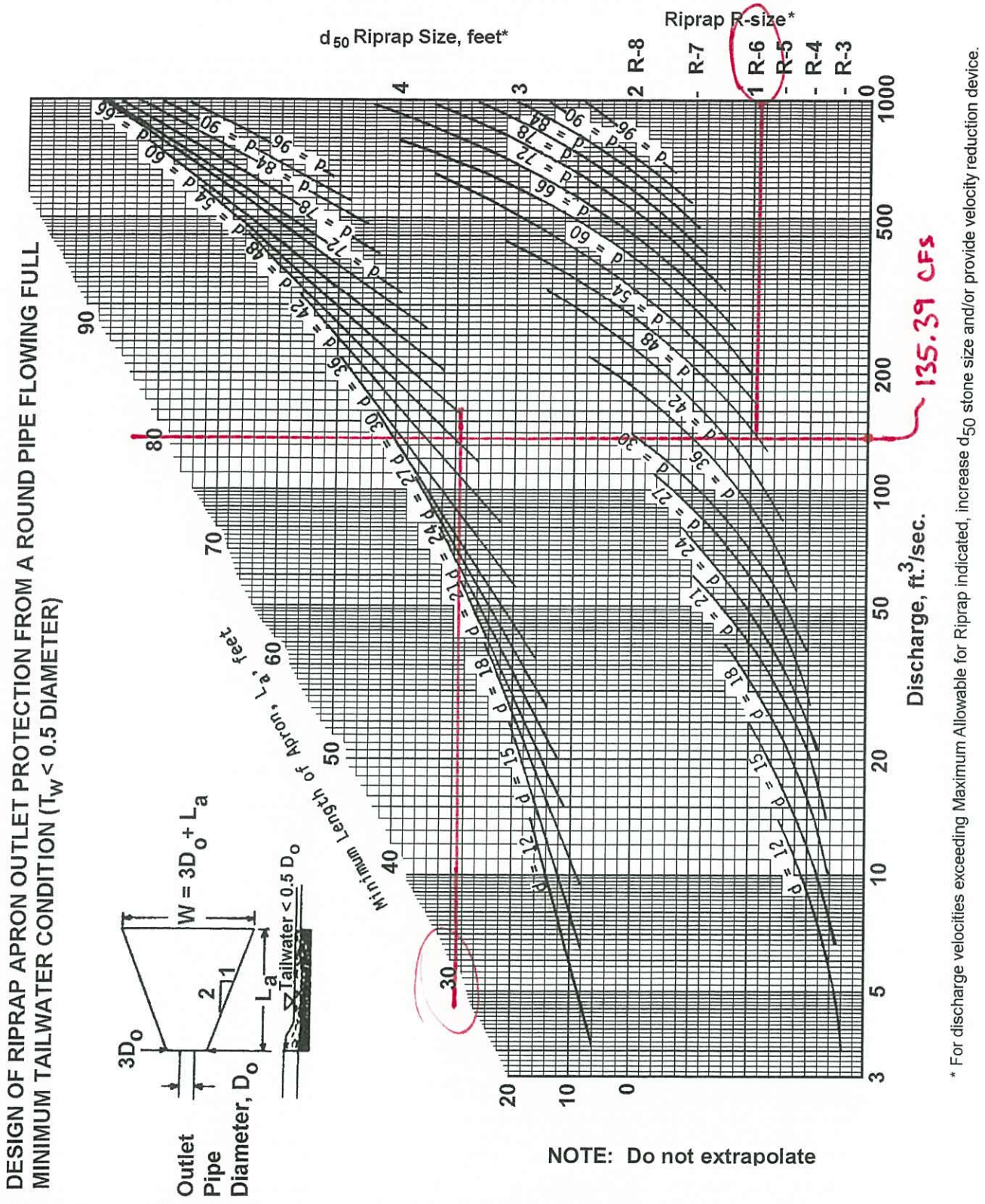
Design Discharge = 142.25 cfs

Maximum Headwater = 6.50 ft

(BOLD indicates design pipe size)

Headwater (ft)	Discharge (cfs) (48 in)	**Discharge (cfs) (54 in)**	Discharge (cfs) (60 in)
0.65	4.39	**4.94**	5.49
1.30	12.42	**13.97**	15.52
1.95	22.81	**25.66**	28.51
2.60	35.12	**39.50**	43.89
3.25	49.07	**55.21**	61.34
3.90	64.51	**72.57**	80.63
4.55	81.29	**91.45**	101.61
5.20	95.23	**111.73**	124.14
5.85	107.75	**127.82**	148.13
6.50	118.96	**142.86**	166.35
7.15	129.20	**156.45**	184.07
7.80	138.68	**168.98**	200.20
8.45	147.54	**180.61**	215.14
9.10	155.92	**191.54**	229.11
9.75	163.88	**201.89**	242.26

FIGURE 9.3
Riprap Apron Design, Minimum Tailwater Condition



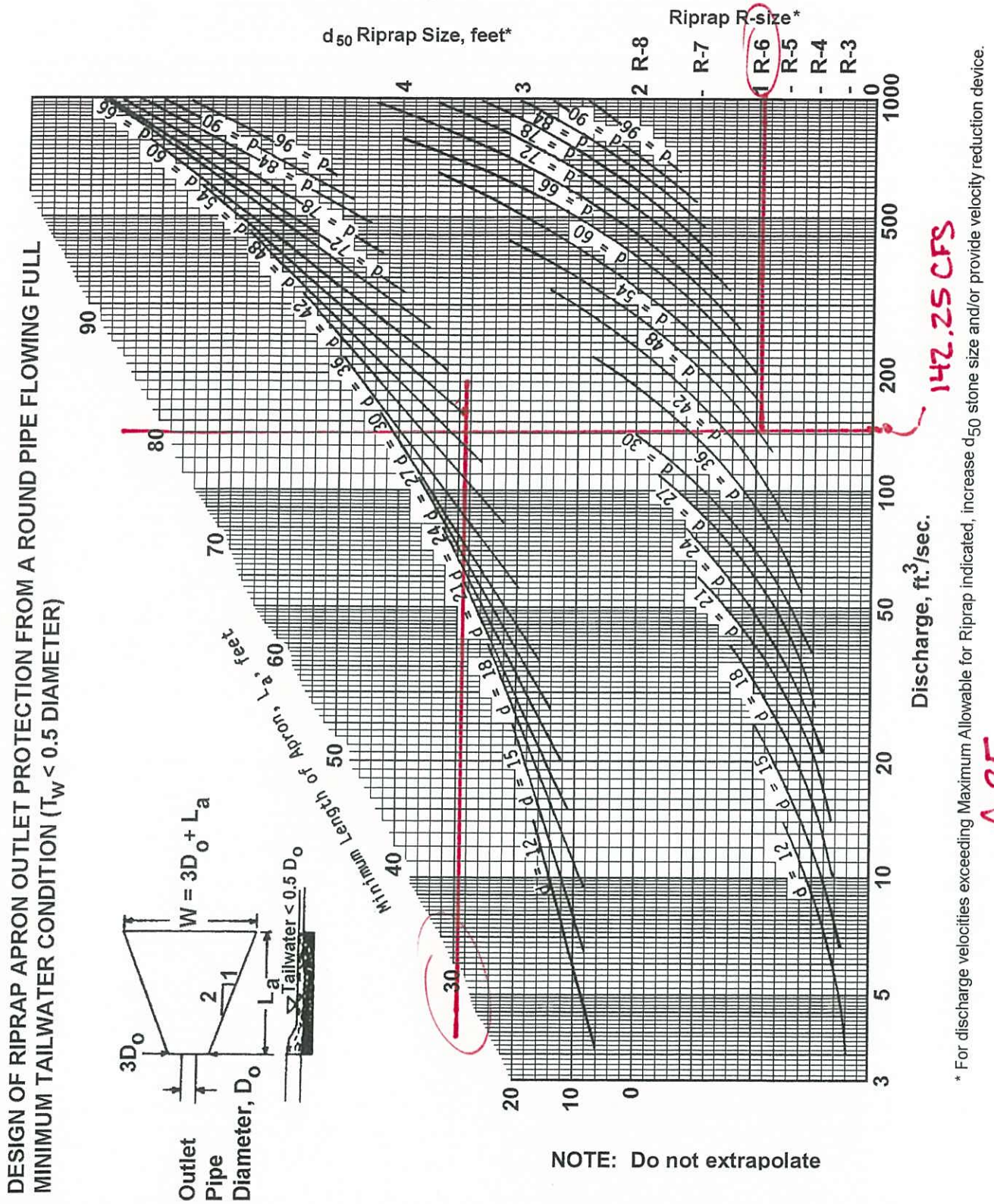
* For discharge velocities exceeding Maximum Allowable for Riprap indicated, increase d_{50} stone size and/or provide velocity reduction device.

Adapted from USDA - NRCS

Not to be used for Box Culverts

C-23

FIGURE 9.3
Riprap Apron Design, Minimum Tailwater Condition



* For discharge velocities exceeding Maximum Allowable for Riprap indicated, increase d_{50} stone size and/or provide velocity reduction device.

Adapted from USDA - NRCS

Not to be used for Box Culverts

NORTHERN REALIGNMENT
STORM SEWER PIPE
VELOCITY CALCULATIONS

Given Size of Storm Sewer Pipes as follows:

C-17	-	48"	-	4'
C-22	-	24"	-	2'
C-23	-	54"	-	4.5'
C-25	-	54"	-	4.5'

Given Q (CFS) as follows:

C-17	-	101.69
C-22	-	33.70
C-23	-	135.39
C-25	-	142.25

Solve for Cross-Section Ai Area of Culverts:

C-17

$$Ai = \frac{\pi (Di)^2}{4}$$

$$Ai = \frac{3.14\ (4)^2}{4}$$

$$Ai = 12.56'$$

C-22

$$Ai = \frac{\pi (Di)^2}{4}$$

$$Ai = \frac{3.14(2)^2}{4}$$

$$Ai = 3.14'$$

C-23

$$Ai = \frac{\pi (Di)^2}{4}$$

$$Ai = \frac{3.14(4.5)^2}{4}$$

$$Ai = 15.90'$$

C-25

$$Ai = \frac{\pi (Di)^2}{4}$$

$$Ai = \frac{3.14(4.5)^2}{4}$$

$$Ai = 15.90'$$

Solve for Velocity in Culverts:

C-17

$$\frac{Q}{A} = V$$

$$\frac{101.69\ CFS}{12.56} = V$$

$$8.10\ ft/sec = V$$

Solve for Velocity in Culverts
continued:

C-22

Q
-- = V
A

33.70 CFS
---------- = V
3.14'

10.73 ft/sec = V

C-23

Q
-- = V
A

135.39 CFS
---------- = V
15.90'

8.52 ft/sec = V

C-25

Q
-- = V
A

142.25 CFS
---------- = V
15.90'

8.95 ft/sec = V

SECTION 10

Appendix L

Post Construction Water Quality Analysis

APPENDIX L

POST CONSTRUCTION WATER QUALITY ANALYSIS

As outlined within Section 9.0 of the Narrative the Water Quality Volume associated with the land cover change for the Northern Realignment is 43,419 cubic feet. Since infiltration is prohibited onsite by Ordinance as discussed in Section 9.0 of the narrative. The chosen method to address the water quality volume is by the combination of two (2) acceptable BMP's vegetated swales (landfill benches) and dry extended detention Basin #2 as per LST Stormwater Ordinance Section 137-15G(1). The majority of runoff onsite is conveyed from the landfill slope via a vegetated swale (bench) to a down drain and then either piped or conveyed in a riprap swale to the detention basin. It is the combination of the vegetated bench swale having a maximum grade of 3% and the dry extended detention basin which will provide adequate treatment of the water quality volume.

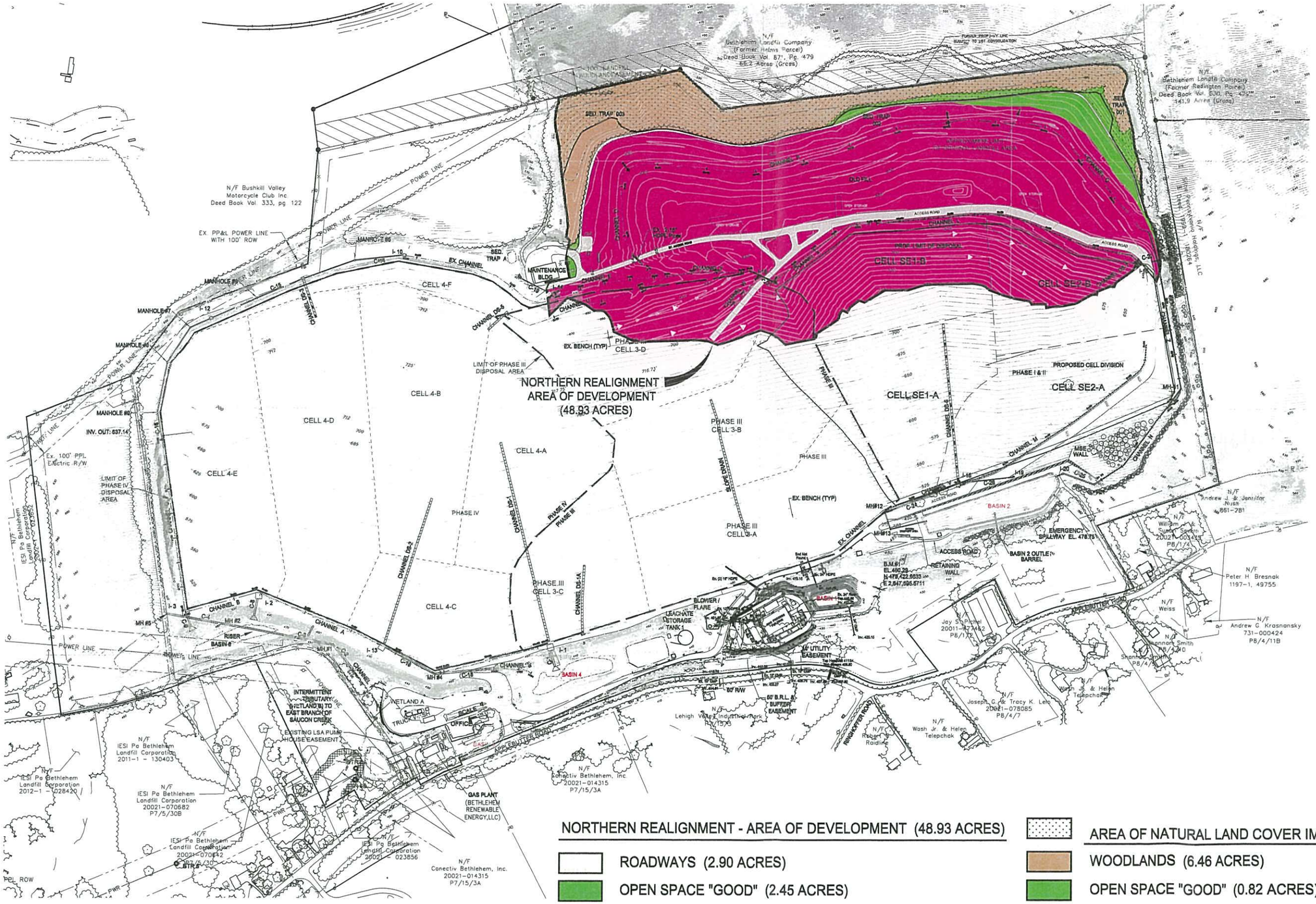
Further, we have completed a PaDEP Post Construction Stormwater Worksheet for the project area attached herein. As shown on the worksheet the Water Quality Requirement is met by the use of Vegetated Swales and Basin #2 (dry extended detention basin). Almost 9,500 linear feet of vegetated bench swale is proposed for the project along with a dry extended detention basin with a vegetated bottom.

The vegetated swale is listed as a BMP within the Pennsylvania Stormwater Best Management Practices Manual as a medium/high Stormwater Quality Function providing water quality treatment of 50% for TSS, 50% for TP and 20% for NO_3. All design parameters for the bench vegetated swales are met including a longitudinal slope of 1 to 6% maximum, side slopes of 3:1, and maintaining adequate freeboard. In addition the bench vegetated swale serves as a pre-treatment facility prior to the detention basin.

The detention basin in series with the bench vegetated swale is listed as a Low Water Quality BMP providing water quality treatment of 60% for TSS, 40% for TP and 20% for NO_3 within the PA Stormwater BMP Manual. Design requirements within the Pennsylvania Best Management

Practices Manual for the detention basin are met including the length to width ratio maximizing the flow path from pipe inlets and combining with other BMPs (vegetated swales). Maximum dewatering times are exceeded but this is as a result of the low rate of discharge requirements. In order to meet dewatering time requirements the release rates would need to be increased which would result in non-compliance with the Act 167 Plan. Additionally, a forebay is not proposed given the vegetated swales (benches) and even to a certain extent the riprap channels provide adequate filtering of the runoff prior to discharging to the detention basin.

In summary, the use of a vegetated swale and detention basin in series will serve to meet the water quality volume for the Northern Realignment. Additionally, the site including the subject detention Basin #2 is monitored under the NPDES Permitting Program to ensure water quality treatment is achieved.



NORTHERN REALIGNMENT - AREA OF DEVELOPMENT (48.93 ACRES)

- ROADWAYS (2.90 ACRES)
- OPEN SPACE "GOOD" (2.45 ACRES)
- OPEN SPACE "POOR" (36.14 ACRES)
- WOODLANDS (7.44 ACRES)

AREA OF NATURAL LAND COVER IMPACT (7.28 ACRES)

- WOODLANDS (6.46 ACRES)
- OPEN SPACE "GOOD" (0.82 ACRES)

Scale: 1"=400'
Job # 1162.4
Date: 07/24/20
By: JTF / DHB
Chk'd: JM

PRE DEVELOPMENT LAND COVER PLAN

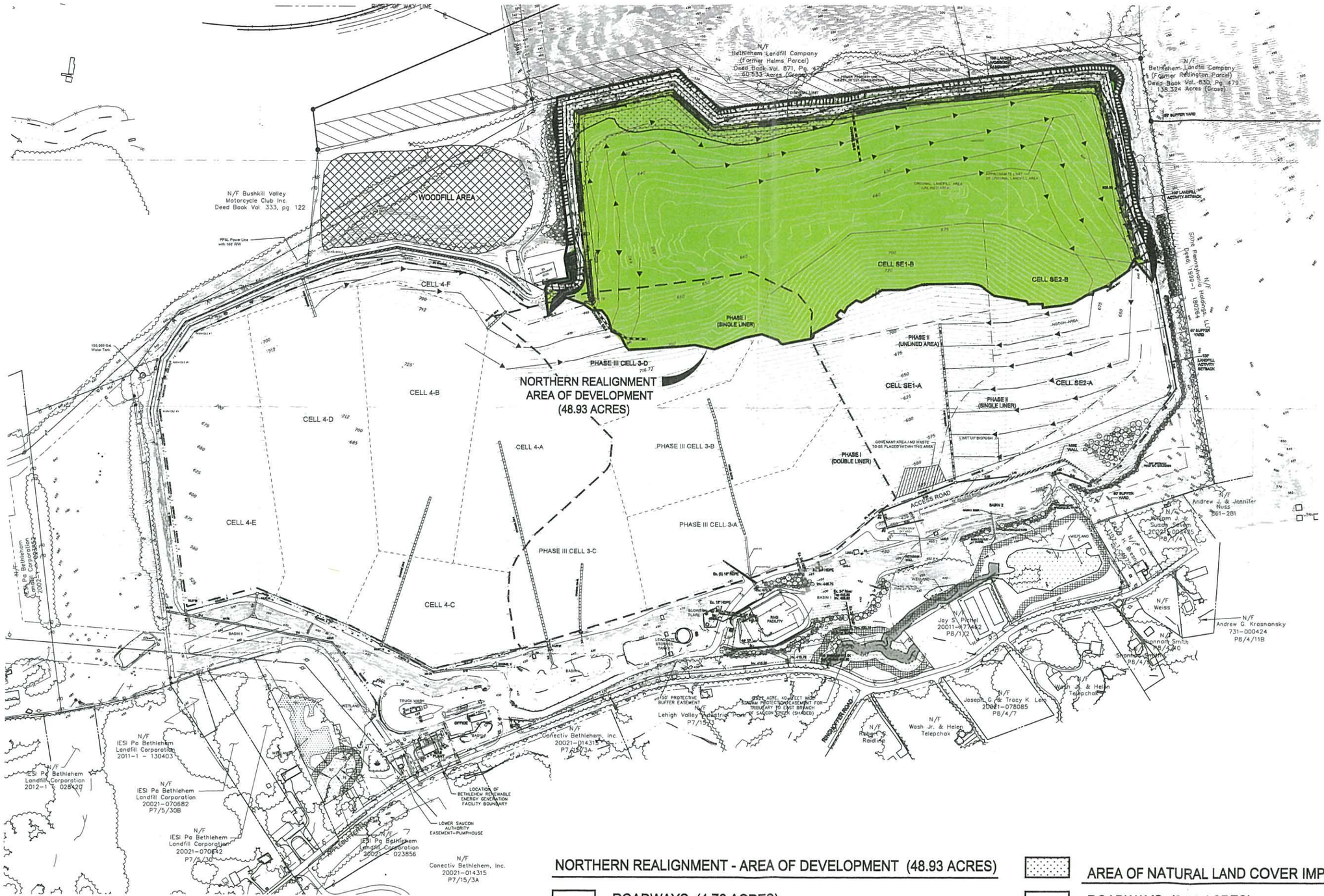
NORTHAMPTON CO.
LOWER SAUCON TWP

Bethlehem Landfill Company

PENNSYLVANIA

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

FILE: 1162.5 – 1162 evWQ.dwg



NORTHERN REALIGNMENT - AREA OF DEVELOPMENT (48.93 ACRES)

- ROADWAYS (4.76 ACRES)
- OPEN SPACE "GOOD" (0.47 ACRES)
- OPEN SPACE "POOR" (43.70 ACRES)

AREA OF NATURAL LAND COVER IMPACT (7.28 ACRES)

- ROADWAYS (3.86 ACRES)
- OPEN SPACE "GOOD" (0.24 ACRES)
- OPEN SPACE "POOR" (3.18 ACRES)

Scale: 1"=400'
Job # 1162.4
Date: 07/24/20
By: JTF / DHB
Chk'd: JM

POST DEVELOPMENT LAND COVER PLAN

NORTHAMPTON CO.

LOWER SAUCON TWP.

Bethlehem Landfill Company

PENNSYLVANIA

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

FILE: 1162.5 - 1162 swWQ.dwg

General Information

Instructions | *General* | Volume | Rate | Quality

Project Name: **Realignment**

Application Type: **Other**

County: **Northampton**

Municipality: **Lower Saucon Township**

Project Type: **Other**

○ New Project ◉ Minor / Major Amendment

Area: **48.93** acres
(In Watershed)

Total Earth Disturbance: **48.93** acres
(In Watershed)

No. of Post-Construction Discharge Points: **1**

Start DP Numbering at: **001**

Discharge Point (DP) No.	Drainage Area (DA) (acres)	Earth Disturbance in DA (acres)	Existing Impervious in DA (acres)	Proposed Impervious in DA (acres)	Receiving Waters	Ch. 93 Class	Structural BMP(s)
001	48.93	48.93	2.90	4.76			Yes
Undetained Areas	0.00	0.00	0.00	0.00			
Totals:	**48.93**	**48.93**	**2.9**	**4.76**			

Volume Management

Project: Bethlehem Landfill - Northern Realignment

Instructions | General | *Volume* | Rate | Quality

2-Year / 24-Hour Storm Event (NOAA Atlas 14): 3 inches

Alternative 2-Year / 24-Hour Storm Event: inches

Alternative Source:

Pre-Construction Conditions: *No. Rows:* 4 ☑ *Exempt from Meadow in Good Condition* ☑ *Automatically Calculate CN, Ia, Runoff and Volume*

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Woods (Good Condition)	7.44	B	55	1.636	0.19	5,261
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	2.45	B	61	1.279	0.37	3,247
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Poor Condition (Grass Cover < 50%)	36.14	B	79	0.532	1.19	155,913
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	2.90	N/A	98	0.041	2.77	29,142
TOTAL (ACRES):	**48.93**				**TOTAL (CF):**	**193,563**

Post-Construction Conditions: *No. Rows:* 3

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	0.47	B	61	1.279	0.37	623
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Poor Condition (Grass Cover < 50%)	43.70	B	79	0.532	1.19	188,528
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	4.76	N/A	98	0.041	2.77	47,832

TOTAL (ACRES): 18.93 TOTAL (CF): 236,983

IET CHANGE IN VOLUME TO MANAGE (CF): 43,420

Non-Structural BMP Volume Credits:

☐ Tree Planting Credit

☐ Other (attach calculations):

Structural BMP Volume Credits: *No. Structural BMPs:* 2 *Start BMP Numbering at:* 1

DP No.	BMP No.	BMP Name	MRC?	Discharge	Incremental BMP DA (acres)	Volume Routed to BMP (CF)	Infiltration / Vegetated Area (SF)	Infiltration Rate (in/hr)	Infiltration Period (hrs)	Vegeta-ted?	Media Depth (ft)	Storage Volume (CF)	Infiltration Credit (CF)	ET Credit (CF)
001	1	Vegetated Swale	-	to BMP No. 2	31.17	90,169	75,616	0.00	1	Yes	1.0	0	**0**	**23,214**
001	2	Dry Extended Detention Basin	-	Off-Site	17.76	146,814	26,136	0.00	1	Yes	1.5	0	**0**	**10,938**
												Totals:		**34,152**

INFILTRATION & ET CREDITS (CF): 34,152

NET CHANGE IN VOLUME TO MANAGE (CF): 43,420

TOTAL CREDITS (CF): 34,152

VOLUME REQUIREMENT NOT SATISFIED

Water Quality

Project: Bethlehem Landfill - Northern Realignment

PRINT

Instructions | General | Volume | Rate | *Quality*

Pre-Construction Pollutant Loads:

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Woods (Good Condition)	Deciduous Forest/Evergreen Forest/Mixed Forest	7.44	B	5,261	45	0.13	1.05	14.78	0.04	0.34
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	2.45	B	3,247	78	0.25	1.25	15.82	0.05	0.25
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Poor Condition (Grass Cover < 50%)	Open Space	36.14	B	155,913	78	0.25	1.25	759.38	2.43	12.17
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	2.90	N/A	29,142	65	0.29	2.05	118.28	0.53	3.73
	TOTAL (ACRES):	**48.93**					**TOTALS:**	**908.26**	**3.06**	**16.50**

Post-Construction Pollutant Loads (without BMPs):

Land Cover (from Volume Worksheet)	Land Cover for Water Quality	Area (acres)	Soil Group	Runoff Volume (cf)	Pollutant Conc. (mg/L)			Pollutant Loads (lbs)		
					TSS	TP	TN	TSS	TP	TN
Open Space (Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Good Condition (Grass Cover > 75%)	Open Space	0.47	B	623	78.00	0.25	1.25	3.03	0.01	0.05

Open S[(Lawns, Parks, Golf Courses, Cemeteries, Etc.) - Poor Condition (Grass Cover < 50%)	Open Space	43.70	B	188,528	78.00	0.25	1.25	918.23	2.94	14.72
Impervious Areas: Paved Parking Lots, Roofs, Driveways, Etc. (Excluding ROW)	Residential	4.76	N/A	47,832	65.00	0.29	2.05	194.14	0.87	6.12
	TOTAL (ACRES):	**48.93**					**TOTALS:**	**######**	**3.82**	**20.89**

POLLUTANT LOAD REDUCTION REQUIREMENTS (LBS):	207.15	0.76	4.39

☐ **Characterize Undetained Areas (for Untreated Stormwater)**

Land Cover	Area (acres)	Soil Group	CN	Ia (in)	Q Runoff (in)	Runoff Volume (cf)

Non-Structural BMP Water Quality Credits:

☐ Pervious Undetained Area Credit

☐ Other (attach calculations)

Structural BMP Water Quality Credits:

☑ *Use default BMP Outflows and Median BMP Outflow Concentrations*

DP No.	BMP No.	BMP Name	MRC?	BMP DA (acres)	Vol. Routed to BMP (CF)	Inf. & ET Credits (CF)	Capture & Buffer Credits (CF)	Outflow (CF)	Outflow Conc. (mg/L)			Pollutant Loads (lbs)		
									TSS	TP	TN	TSS	TP	TN
001	1	Vegetated Swale	-	31.17	90,169	23,214		66,955	-	-	-	-	-	-
001	2	Dry Extended Detention Basin	-	17.76	146,814	10,938		135,876	24.30	0.19	1.19	206.17	1.61	10.10

TSS	TP	TN

POLLUTANT LOADS FROM STRUCTURAL BMP (TREATED) OUTFLOWS (LBS):	206.17	1.	10.10
POLLUTANT LOADS FROM UNTREATED STORMWATER (LBS):	315.14	1.08	5.90
NON-STRUCTURAL BMP WATER QUALITY CREDITS (LBS):			
NET POLLUTANT LOADS FROM SITE, POST-CONSTRUCTION (LBS):	521.31	2.69	16.00
POLLUTANT LOADS FROM SITE, PRE-CONSTRUCTION (LBS):	908.26	3.06	16.50

WATER QUALITY REQUIREMENT SATISFIED

CERTIFICATION

I certify under penalty of law and subject to the penalties of 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities) that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I further certify that the structure, function, and calculations contained in this spreadsheet have not been modified in comparison to the spreadsheet DEP has posted to its website or, if modifications were made, an explanation of the modifications made is attached to this spreadsheet.

Spreadsheet User Name

Date

Appendix M

Emergency Spillway Supporting Calculations

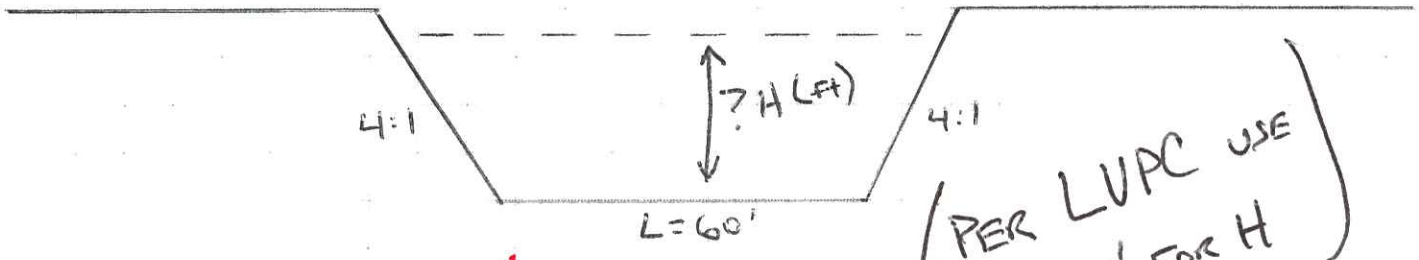
PAGE #1

MARTIN AND MARTIN, INC.
37 South Main Street - Suite A
CHAMBERSBURG, PENNSYLVANIA 17201
(717) 264-6759
FAX (717) 264-7339
E-mail martinmartin@internet.net

JOB 1162.4 NORTHERN REALIGNMENT
SHEET NO. 1 OF 1
CALCULATED BY JTF DATE 7/6/2020
CHECKED BY JMM DATE 7/6/2020
SCALE REVISED 09/2020

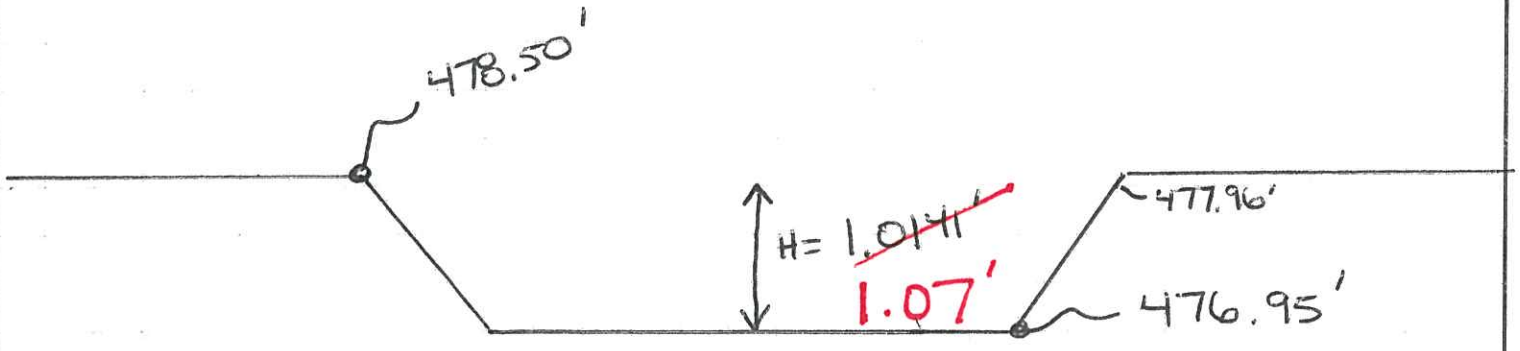
? WILL THE EMERGENCY SPILLWAY OF BASIN #2 AT BETHLEHEM LANDFILL PASS THE 100 YEAR REPEAT STORM EVENT WITH 0.5' OF FREEBOARD RELATIVE TO THE TOP OF BASIN BERM

GIVEN: Q = 199.07 CFS
L (OF SPILLWAY) = 60'
SIDE SLOPES OF SPILLWAY = 4:1



H = 0.99' ≈ ~~1.0141'~~ 1.07'

(PER LUPC USE 1.07' FOR H)



478.50' - 0.50' (FREEBOARD) = 478.00'
476.95' + ~~1.014'~~ 1.07' = ~~477.96'~~ 478.02'

~~478.00' > 477.96'~~ ✓ OK

478.00' < 478.02' (X) → CONT

PAGE #2

MARTIN AND MARTIN, INC.
37 South Main Street - Suite A
CHAMBERSBURG, PENNSYLVANIA 17201
(717) 264-6759
FAX (717) 264-7339
E-mail martinmartin@internet.net

JOB 1162.4 NORTHERN REALIGNMENT
SHEET NO. 1 OF 2
CALCULATED BY JTF DATE 9/2020
CHECKED BY JMM DATE 9/2020
SCALE N/A

ASSUME 478.00 < 478.02 (X)

THEREFORE: 478.03 > 478.02 (√ OK)

HENCE (TOP OF BERM EL.) − (FREEBOARD)

$X - 0.50' = 478.03'$

$X = 478.03' + 0.50'$

$X = 478.53'$

TOP OF BASIN 2 BERM REVISED TO

478.53'

Cipolletti (Trapezoidal) Weir

This calculator determines the flow rate for a Cipolletti weir, which is a commonly used weir in many irrigation districts. The weir opening has a flat bottom and sides that have a particular slope. The water before the weir should be held in a relatively calm and smooth pool. The length is found by measuring the bottom width of the Cipolletti weir. The height is measured from the water height above the bottom of the weir.

Learn more about the units used on this page.

Length:

60 ft

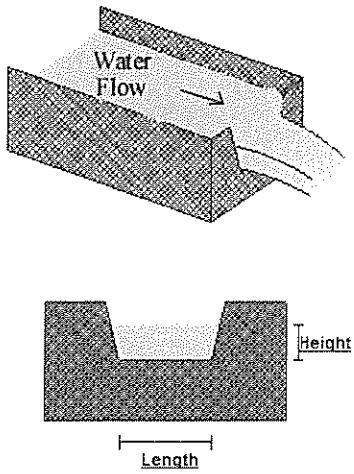
Height:

1.0141 ft

Calculate

Flow Rate:

199.09 cfs



The Equation

The equation to determine the flow rate (Q) for a Cipolletti (Trapezoidal) Weir is:

$$Q = 3.247LH^{1.48} - \frac{0.566L^{1.9}}{1+2L^{1.8}}H^{1.9} + 0.609H^{2.5}$$

Where:

Q = Flow Rate in cfs.

L = Width of the weir crest in feet.

H = Height of the upstream water above the weir crest in feet.

WSU Prosser - IAREC, 24106 N Bunn Rd, Prosser WA 99350-8694, 509-786-2226, Contact Us

Cipoletti (Trapezoidal) Weir Calculator

Discharge, Head, and Weir Length Calculations. Equations and Installation Guidelines.

Solve for: Click to Calculate Initial Values

Head

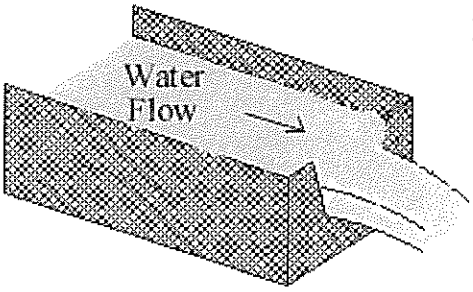
Discharge, Q: 199.07 ft3/s (cfs)

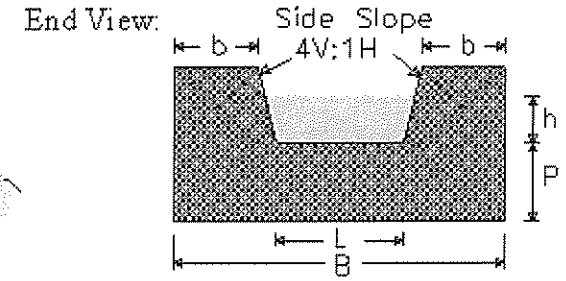
Head, h: 0.99024114 ft

Length, L: 60 ft

Units in Cipoletti weir calculation: ft=foot, gal=US gallon, m=meter, min=minute, s=second.

Cipoletti Weir:





Cipoletti weir topics: Introduction Equations Installation Guidelines and Equation Applicability Error Messages References

Introduction

Weirs are typically installed in open channels such as streams to determine discharge (flowrate). The basic principle is that discharge is directly related to the water depth (h) in the figure above; h is known as the "head." The Cipoletti (or trapezoidal) weir has side slopes in the vertical to horizontal ratio of 4 to 1. Cipoletti weirs are considered fully contracted and have the installation requirements shown below. The discharge coefficient for Cipoletti weirs is 3.367 (in English units), and it does not depend on L or P like it does for a rectangular weir. Though the discharge coefficient formulation is simpler than for rectangular weirs, its accuracy is not as good - about ±5% (USBR, 1997). Cipoletti is sometimes spelled Cipoleti, Cipolleti, Cipolletti, Cippoleti, Cippolleti, Cippoletti, and Cippolletti.

Cipoletti Weir Equation

The Cipoletti weir equation is shown below for Q in cfs (ft^3/s) and head and length in feet units (USBR, 1997). Our calculation allows you to work in a variety of units.

$$Q = 3.367\ L\ h^{3/2}$$

where Q = Discharge (cfs), L = Weir Length (ft), h = Head (ft)

Note that L is measured along the bottom of the weir (called the crest), not along the water surface.

Cipoletti Weir Installation Guidelines and Equation Applicability (USBR,

To: LMNO Engineering home page (more calculations)

Related calculations:

Weirs: Rectangular V-Notch

End Depth Method: Circular Rectangular Triangular

Flumes: Parshall (submerged)

Parshall, Trapezoidal, Rectangular, and U shape

Unit Conversions

Register

1997) Top of Page

Cipoletti weir side slopes should have a vertical to horizontal ratio of 4 to 1.

Head (h) should be measured at a distance of at least 4h upstream of the weir.

.t doesn't matter how thick the weir is except where water flows through the weir. The weir should be between 0.03 and 0.08 inches (0.8 to 2 mm) thick in the opening. If the bulk of the weir is thicker than 0.08 inch, the downstream edge of the opening can be chamfered at an angle greater than 45° (60° is recommended) to achieve the desired thickness of the edges. You want to avoid having water cling to the downstream face of the weir.

Water surface downstream of the Cipoletti weir should be at least 0.2 ft. (6 cm) below the weir crest (i.e. below the bottom of the opening).

Measured head (h) should be greater than 0.2 ft. (6 cm) but less than L/3.

P is measured from the bottom of the upstream channel and should be greater than $2h_{max}$ where h_{max} is the maximum expected head.

b is measured from the sides of the channel and also should be greater than $2h_{max}$.

Error Messages in Cipoletti weir calculation

Top of Page

"All inputs must be positive". This is an initial check of user input.

References

USBR (1997). U.S. Department of the Interior, Bureau of Reclamation. Water Measurement Manual. 1997. 3ed. Available from http://www.usbr.gov/tsc/techreferences/mands/wmm/index.htm .

Please contact us for consulting or questions about weirs and flow measurement.

LMNO Engineering, Research, and Software, Ltd.
7860 Angel Ridge Rd. Athens, Ohio 45701 USA Phone: (740) 707-2614
LMNO@LMNOeng.com https://www.LMNOeng.com

Appendix N

Offsite Drainage Area Analysis
(Lehigh – North)

Lehigh Valley Planning Commission
Offsite Drainage Area Analysis

At the request of the Lehigh Valley Planning Commission (LVPC), the following is a stormwater analysis of the Offsite Area at the northern portion of the Bethlehem Landfill Company's property. During the course of development (1990's to present) at Bethlehem Landfill Company, no landcover modification resulting in greater stormwater runoff has been proposed within the Offsite Area. Further, the size of the drainage area tributary to the Offsite Area has routinely been decreased in size , thereby negating the need to analyze the drainage area during said development. LVPC has requested a stormwater analysis of this area in conjunction with the submission of the Northern Realignment Plans of 2020.

A. RUNOFF CURVE NUMBER (CN) CALCULATION

Runoff curve numbers for the project drainage shed (Offsite Area – Lehigh River) was obtained from Appendix C-3 of the Lower Saucon Township Stormwater Ordinance. A copy is attached hereto. Under pre-development conditions three (3) distinct land covers exist within the area of analysis. These are woods, paved/impervious and open space.

Pre-development analysis for the Offsite Area was taken from the Phases III and IV analysis and as such the previously utilized CN numbers have been maintained. These are 61 for grass areas outside the landfill footprint and 79 for grass areas within the landfill footprint.

Post development conditions yield the same three land covers as utilized in pre-development consisting of woods, paved/impervious and open space. However, as was done within the Phases III and IV analysis open space was broken into two categories, good and poor, relating to capped areas for final closure grades. Thus the curve numbers utilized within the analysis are as follows:

Woods	=	55
Grass – Open Space (Good)	=	61
Grass – Open Space (Poor)	=	79
Impervious	=	98

Thus, each sub-watershed weighted Cn is calculated as follows:

Drainage Area ID	CN	Weighted CN
Pre-Development Offsite Area	60	$\frac{(1.37)(98) + (17.44)(61)+(16.28)(55)}{(35.09)} = 60$
Post-Development Offsite Area	63	$\frac{(2.24)(98) + (10.82)(61)+(7.90)(55)}{(20.96)} = 63$

B. TIME OF CONCENTRATION FLOW PATH CALCULATION

Times of concentration calculation were computed within the Hydraflow Hydrographs Program. Hydraflow Hydrographs shows the time of concentration for the subject watershed. Drainage area to the Offsite Area has been reduced with each phase of Development at Bethlehem Landfill Company. Time of Concentration calculations are contained within this report.

C. RATE ANALYSIS

Pre Construction Peak Runoff Analysis (Offsite Area)

Pre-construction peak runoff volume and peak discharge was analyzed at one point of interest (POI). POI-1 is located approximately 800' North of the Bethlehem Landfill Company maintenance shop. Peak runoff rate was calculated at the point of interest for the two (2), ten (10), twenty-five (25), and one-hundred (100) year storm events. Pre-construction hydrograph summaries and detailed hydrographs are provided in this report. A pre-construction drainage area map is included within this report. The following table is a summary of existing peak discharges from the project site.

Table 7.0 – Pre-construction Peak Discharge Summary In Cubic Feet per Second	
Design Storm Event	**POI-1 (Offsite Area)**
2-year	13.90
10-year	75.62
25-year	92.11
100-year	150.19

Post Construction Peak Rate Management

Post construction peak runoff was calculated for the same point of interest examined in the pre-construction analysis, thus a direct comparison is made. A post construction drainage area map is included within this report. Peak runoff rates were calculated for the two (2), ten (10), twenty-five (25), and one-hundred (100) year storm events. No management of Post construction peak discharge rates is proposed as Post Construction rates are less than Pre-Construction discharge rates.

The following table is a summary of proposed post construction peak discharges compared to pre-construction discharges for each drainage shed. Post construction hydrograph summaries are provided in this report.

Table 8.0 – Post Construction Peak Discharge Summary In Cubic Feet per Second – with Stormwater Controls								
Design Storm Event	**DESIGN STORM EVENT (CFS)**							
	2 yr/24 hr		**10 yr/24 hr**		**25 yr/24 hr**		**100 yr/24 hr**	
	PRE	POST	PRE	POST	PRE	POST	PRE	POST
Offsite Area	13.90	**13.15**	75.62	**53.75**	92.11	**64.28**	150.19	**100.85**

As evidenced by the results presented above, post construction peak discharge rates will be less than pre-construction peak discharge rates for all storm events analyzed. Thus, since the pre-development approved rates account for required release rates meeting Act 167 the proposed development meets or exceeds the requirement as it relates to rate control.

D. Post Construction Water Quality Analysis (Volume)

As shown on the plans provided in this report for Pre and Post Development, the Offsite Area in question encompasses 35.09 acres in the pre-development condition and 20.96 acres in the post-development condition. Pre-Development condition of this area includes Woodlands, Grass Cover and Impervious Area. The proposed land cover of the area in the Post-Development condition will also include woodlands, grass, and impervious surface. A direct comparison of the pre and post water quality volume condition is made to determine the need or lack thereof of water quality measures. Water Quality Volume can be calculated as follows:

Where: **(PRE-DEVELOPMENT)**

c = Rational Method Post Development Coeff - 2yr Storm

$$c = \frac{(0.30)(17.44 \text{ Ac.})+(0.26)(16.28 \text{ Ac.}) + (0.97)(1.37 \text{ Ac.})}{35.09}$$

Where: 1.37 Ac. is impervious (0.97)
17.44 Ac. is meadow/lawn "good" (0.30)
16.28 Ac. is woods (0.26)

c = 0.31

P = 1.25 inches

A = Area of Prop. New Activity or Land Cover Change (35.09 ac.)

1.) $$WQv = \frac{(c)(P)(A)}{12}$$

$$WQv = \frac{(0.31)(1.25 \text{ in.})(35.09 \text{ Ac.})}{12}$$

WQv = 1.13 ac-ft or 49,223 cf

Where: (**POST-DEVELOPMENT**)

c = Rational Method Post Development Coeff - 2yr Storm

$$c = \frac{(0.30)(10.82 \text{ Ac.})+(0.26)(7.90 \text{ Ac.}) + (0.97)(2.24 \text{ Ac.})}{20.96}$$

Where: 2.24 Ac. is impervious (0.97)
10.82 Ac. is meadow/lawn "good" (0.30)
7.90 Ac. is woods (0.26)

c = 0.36

P = 1.25 inches

A = Area of Prop. New Activity or Land Cover Change (20.96 ac.)

$$2.)\ WQv = \frac{(c)(P)(A)}{12}$$

$$WQv = \frac{(0.36)(1.25\ in.)\ (20.96\ Ac.)}{12}$$

WQv = 0.79 ac-ft or 34,412 cf

Thus as shown above utilizing calculation methodology #1 the Water Quality Volume is calculated as 1.13 ac-ft or 49,223 cf for the Pre-Development condition of the Offsite Area and 0.79 ac-ft or 34,412 cf for the Post-Development condition of the Offsite area, a net volume reduction of -0.34 ac-ft or -14,810 cf draining offsite to the North from the Bethlehem Landfill Company property.

In keeping with Township Ordinance, a second calculation is required to determine which method results is the higher water quality volume. As shown below, the land cover change and drainage area size from pre (Pre 35.09 Ac.) to post (Post 20.96 Ac.) within the development area results in a calculated water quality volume of **0.0043 ac-ft or 187 cf**.

2-year/24 hour rain event = 3.0 inches

EXISTING CONDITIONS

COVER TYPE/CONDITION	SOIL TYPE	AREA (sf)	Area (ac)	CN	S	Ia (0.2*S)	Q (runoff) (in)	Runoff Vol. (ft^3)	Runoff Vol. (ac-ft)
Woodlands	B	709,157	16.28	55	8.18	-	0.19	11,512	0.264
Grass (Good Condition)	B	759,686	17.44	61	6.39	-	0.37	23,114	0.531
Grass (Poor)	B	-	-	-	-	-	-	-	-
Impervious	B	59,677	1.37	98	0.20	-	2.77	13,766	0.316
TOTAL		**1,528,520**	**35.09**					**48,392**	**1.111**

DEVELOPED CONDITIONS

COVER TYPE/CONDITION	SOIL TYPE	AREA (sf)	Area (ac)	CN	S	Ia (0.2*S)	Q (runoff) (in)	Runoff Vol. (ft^3)	Runoff Vol. (ac-ft)
Grass (Good Condition)	B	471,319	10.82	61	6.39	-	0.37	14,340	0.329
Woodlands	B	344,124	7.90	55	8.18	-	0.41	11,731	0.269
Impervious	B	97,574	2.24	98	0.20	-	2.77	22,508	0.517
TOTAL		**913,018**	**20.96**					**48,579**	**1.115**

INITIAL CHANGE IN RUNOFF VOLUME (POST-PRE)		
CONDITION	Runoff Volume (ft^3)	Runoff Volume (ac-ft)
EXISTING CONDITIONS	48,392	1.111
DEVELOPED CONDITIONS	48,579	1.115
INITIAL CHANGE IN RUNOFF VOLUME	**+187**	**+0.004**

Based upon the calculations above, the larger of the two volumes calculated utilized calculation #2 which resulted in a water quality volume of 187 cf.

The water quality volume result shown above using method #2 is very close to no increase, especially when considering the volume results of methodology #1 (-14,810 cf). Bethlehem Landfill Company proposes no new water quality volume BMP's for the Northern Offsite Area.

The slight volume increase is accounted for under post development conditions by utilizing the following BMP's.

1.) Protecting and Utilizing Natural Flow Paths

2.) Minimizing Disturbance and maintenance of existing vegetated areas

E. Conclusion

We certify that this Stormwater Management Analysis has been prepared according to accepted professional engineering means, methods and standards. The plan is designed in compliance with Lower Saucon Township Stormwater Management Ordinance. The calculations demonstrate that the Offsite Area does not require stormwater management facilities.

Table of Contents

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow Hyd(s)	Peak Outflow (cfs)								Hydrograph description
			1-Yr	2-Yr	3-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	
1	SCS Runoff	-------	0.00	13.90	-------	41.71	75.62	92.11	122.64	150.19	Pre - Development Offsite Area
2	SCS Runoff	-------	0.00	13.15	-------	31.82	53.75	64.28	83.58	100.85	Post - Development Offsite Area

Hydrograph Summary Report

Hyd.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	13.90	1	717	35,586	----	------	------	Pre - Development Offsite Area
2	SCS Runoff	13.15	1	716	27,943	----	------	------	Post - Development Offsite Area

Hydrograph Plot

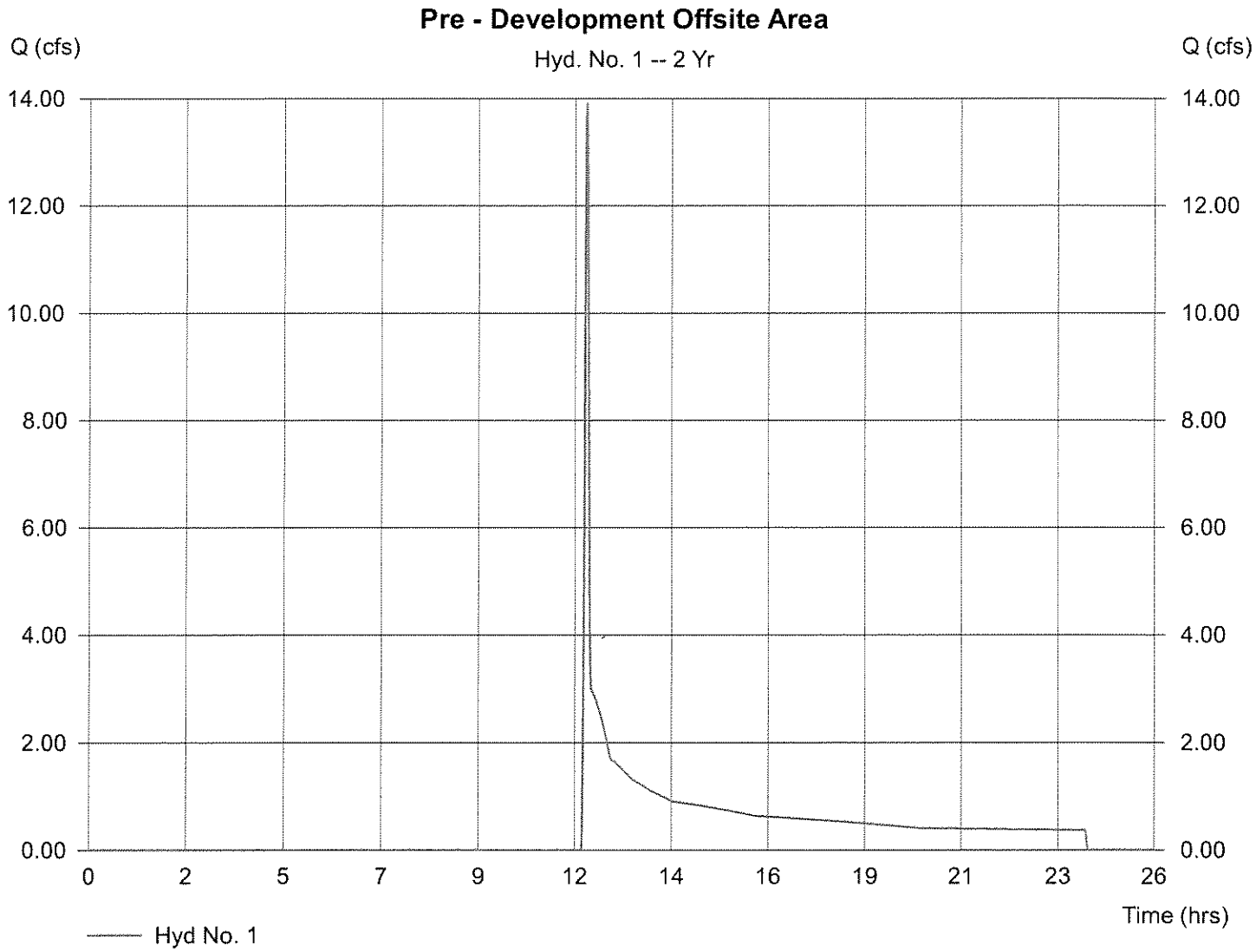
Hydraflow Hydrographs by Intelisolve | Tuesday, Sep 15 2020, 2:29 PM

Hyd. No. 1

Pre - Development Offsite Area

Hydrograph type	= SCS Runoff	Peak discharge	= 13.90 cfs
Storm frequency	= 2 yrs	Time interval	= 1 min
Drainage area	= 35.090 ac	Curve number	= 60
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 2.80 min
Total precip.	= 2.90 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 35,586 cuft



TR55 Tc Worksheet

Hyd. No. 1

Pre - Development Offsite Area

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.011		0.011		0.011		
Flow length (ft)	=	50.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.00		0.00		0.00		
Land slope (%)	=	2.00		0.00		0.00		
Travel Time (min)	**=**	**0.72**	**+**	**0.00**	**+**	**0.00**	**=**	**0.72**
Shallow Concentrated Flow								
Flow length (ft)	=	800.00		0.00		0.00		
Watercourse slope (%)	=	15.88		0.00		0.00		
Surface description	=	Unpaved		Paved		Paved		
Average velocity (ft/s)	=	6.43		0.00		0.00		
Travel Time (min)	**=**	**2.07**	**+**	**0.00**	**+**	**0.00**	**=**	**2.07**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 2.80 min

Hydrograph Plot

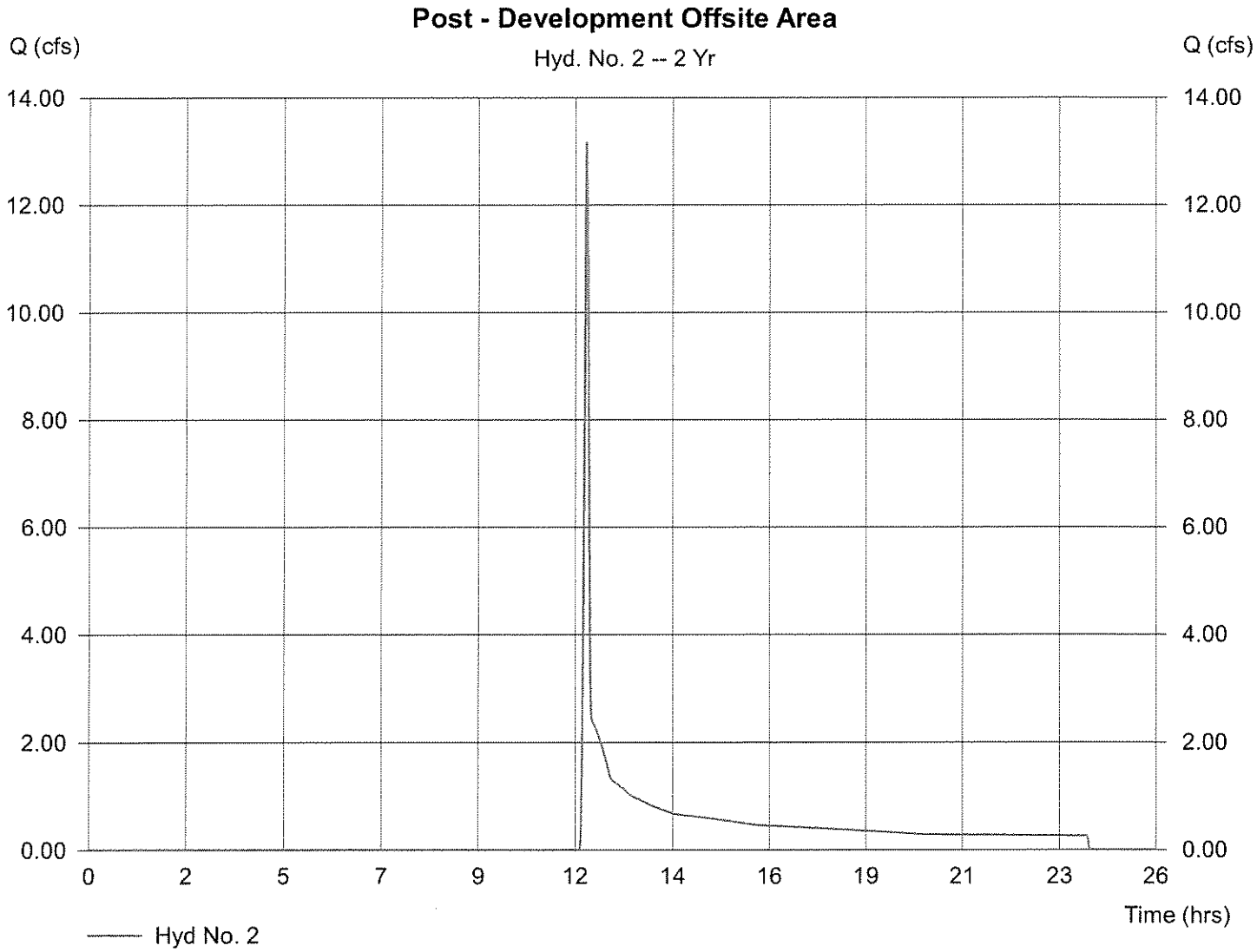
Hydraflow Hydrographs by Intelisolve | Tuesday, Sep 15 2020, 2:29 PM

Hyd. No. 2

Post - Development Offsite Area

Hydrograph type	= SCS Runoff	Peak discharge	= 13.15 cfs
Storm frequency	= 2 yrs	Time interval	= 1 min
Drainage area	= 20.960 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 2.80 min
Total precip.	= 2.90 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 27,943 cuft



TR55 Tc Worksheet

Hyd. No. 2

Post - Development Offsite Area

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.011		0.011		0.011		
Flow length (ft)	=	50.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.00		0.00		0.00		
Land slope (%)	=	2.00		0.00		0.00		
Travel Time (min)	**=**	**0.72**	**+**	**0.00**	**+**	**0.00**	**=**	**0.72**
Shallow Concentrated Flow								
Flow length (ft)	=	800.00		0.00		0.00		
Watercourse slope (%)	=	15.88		0.00		0.00		
Surface description	=	Unpaved		Paved		Paved		
Average velocity (ft/s)	=	6.43		0.00		0.00		
Travel Time (min)	**=**	**2.07**	**+**	**0.00**	**+**	**0.00**	**=**	**2.07**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 2.80 min

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	75.62	1	716	134,901	----	-------	------	Pre - Development Offsite Area
2	SCS Runoff	53.75	1	716	94,326	----	-------	------	Post - Development Offsite Area

Hydrograph Plot

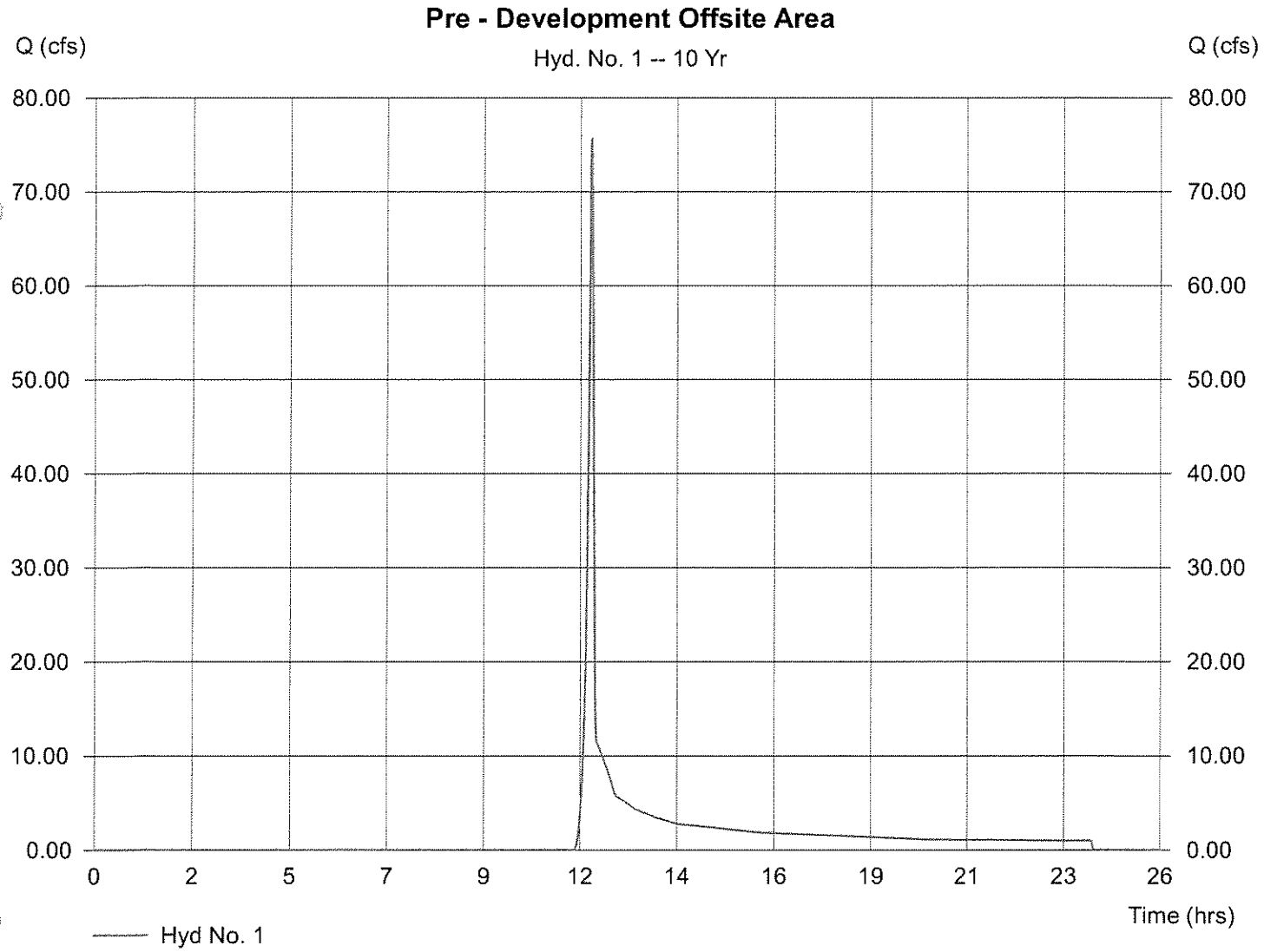
Hydraflow Hydrographs by Intelisolve | Tuesday, Sep 15 2020, 2:29 PM

Hyd. No. 1

Pre - Development Offsite Area

Hydrograph type	= SCS Runoff	Peak discharge	= 75.62 cfs
Storm frequency	= 10 yrs	Time interval	= 1 min
Drainage area	= 35.090 ac	Curve number	= 60
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 2.80 min
Total precip.	= 4.70 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 134,901 cuft



TR55 Tc Worksheet

Hyd. No. 1

Pre - Development Offsite Area

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.011		0.011		0.011		
Flow length (ft)	=	50.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.00		0.00		0.00		
Land slope (%)	=	2.00		0.00		0.00		
Travel Time (min)	**=**	**0.72**	**+**	**0.00**	**+**	**0.00**	**=**	**0.72**
Shallow Concentrated Flow								
Flow length (ft)	=	800.00		0.00		0.00		
Watercourse slope (%)	=	15.88		0.00		0.00		
Surface description	=	Unpaved		Paved		Paved		
Average velocity (ft/s)	=	6.43		0.00		0.00		
Travel Time (min)	**=**	**2.07**	**+**	**0.00**	**+**	**0.00**	**=**	**2.07**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 2.80 min

Hydrograph Plot

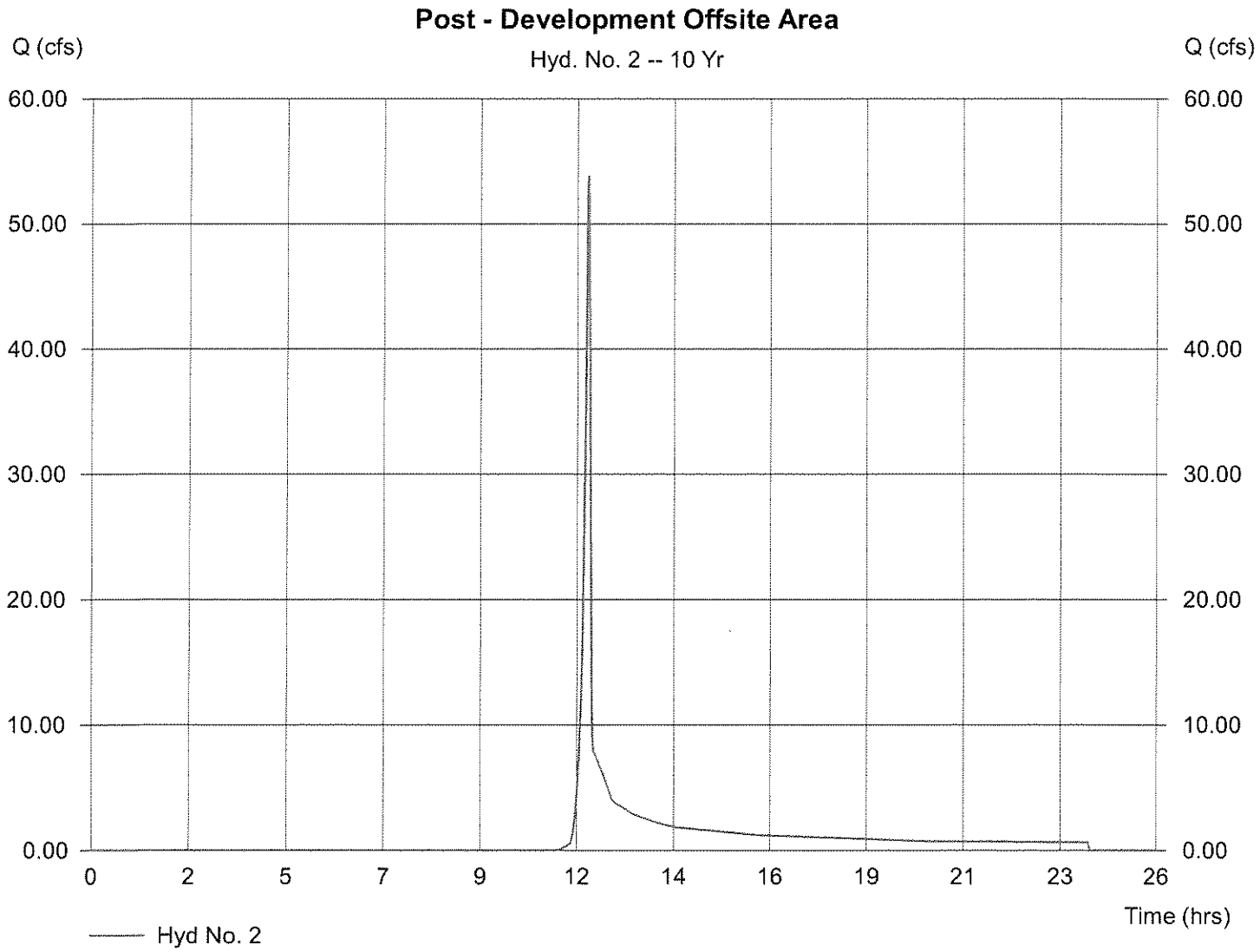
Hydraflow Hydrographs by Intelisolve | Tuesday, Sep 15 2020, 2:29 PM

Hyd. No. 2

Post - Development Offsite Area

Hydrograph type	= SCS Runoff	Peak discharge	= 53.75 cfs
Storm frequency	= 10 yrs	Time interval	= 1 min
Drainage area	= 20.960 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 2.80 min
Total precip.	= 4.70 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 94,326 cuft



TR55 Tc Worksheet

Hydraflow Hydrographs by Intelisolve

Hyd. No. 2

Post - Development Offsite Area

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.011		0.011		0.011		
Flow length (ft)	=	50.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.00		0.00		0.00		
Land slope (%)	=	2.00		0.00		0.00		
Travel Time (min)	**=**	**0.72**	**+**	**0.00**	**+**	**0.00**	**=**	**0.72**
Shallow Concentrated Flow								
Flow length (ft)	=	800.00		0.00		0.00		
Watercourse slope (%)	=	15.88		0.00		0.00		
Surface description	=	Unpaved		Paved		Paved		
Average velocity (ft/s)	=	6.43		0.00		0.00		
Travel Time (min)	**=**	**2.07**	**+**	**0.00**	**+**	**0.00**	**=**	**2.07**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 2.80 min

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	92.11	1	716	162,387	----	------	------	Pre - Development Offsite Area
2	SCS Runoff	64.28	1	716	112,171	----	------	------	Post - Development Offsite Area

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

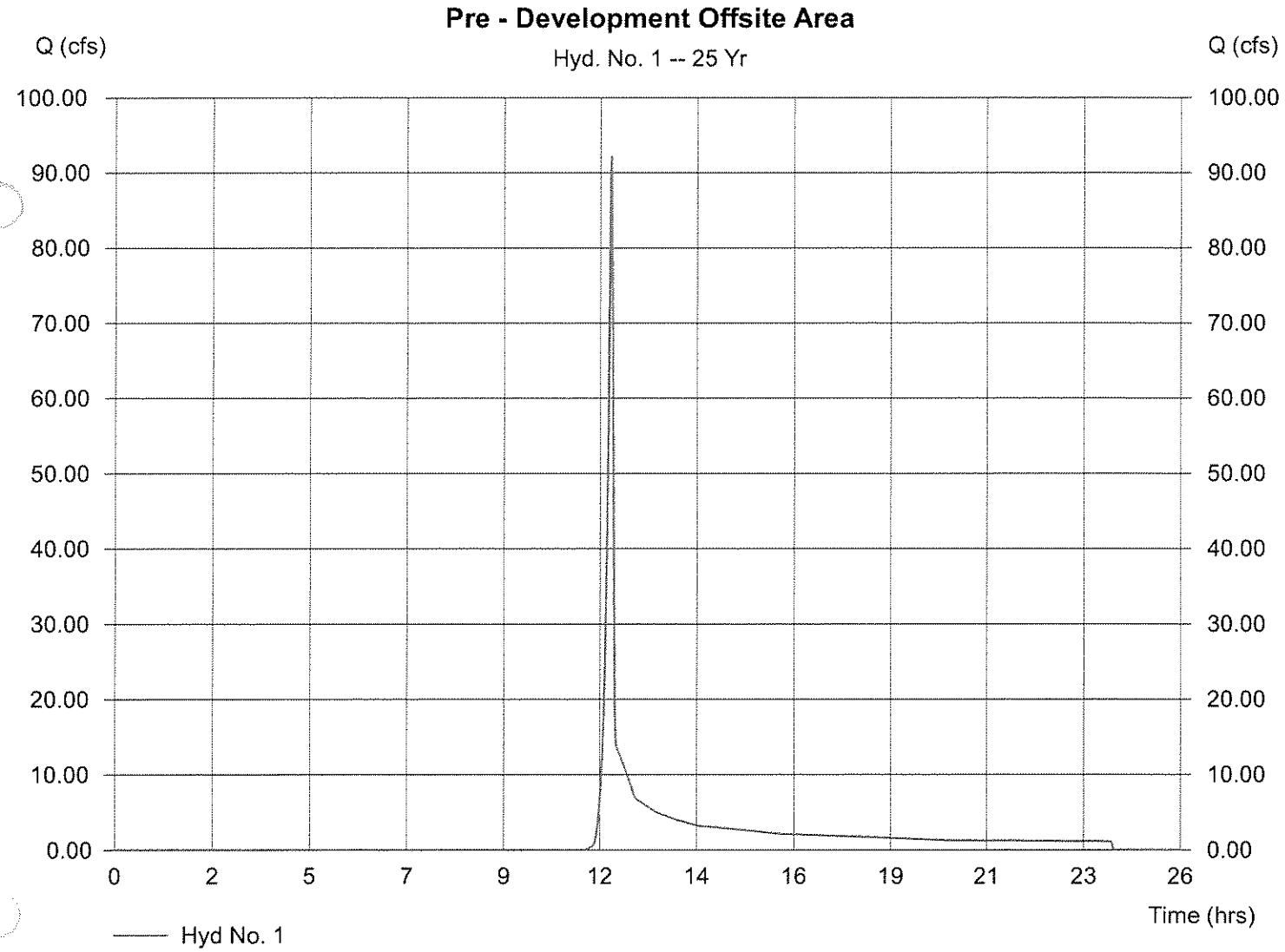
Tuesday, Sep 15 2020, 2:29 PM

Hyd. No. 1

Pre - Development Offsite Area

Hydrograph type	= SCS Runoff	Peak discharge	= 92.11 cfs
Storm frequency	= 25 yrs	Time interval	= 1 min
Drainage area	= 35.090 ac	Curve number	= 60
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 2.80 min
Total precip.	= 5.10 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 162,387 cuft



TR55 Tc Worksheet

Hydraflow Hydrographs by Intelisolve

Hyd. No. 1

Pre - Development Offsite Area

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.011		0.011		0.011		
Flow length (ft)	=	50.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.00		0.00		0.00		
Land slope (%)	=	2.00		0.00		0.00		
Travel Time (min)	**=**	**0.72**	**+**	**0.00**	**+**	**0.00**	**=**	**0.72**
Shallow Concentrated Flow								
Flow length (ft)	=	800.00		0.00		0.00		
Watercourse slope (%)	=	15.88		0.00		0.00		
Surface description	=	Unpaved		Paved		Paved		
Average velocity (ft/s)	=	6.43		0.00		0.00		
Travel Time (min)	**=**	**2.07**	**+**	**0.00**	**+**	**0.00**	**=**	**2.07**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 2.80 min

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

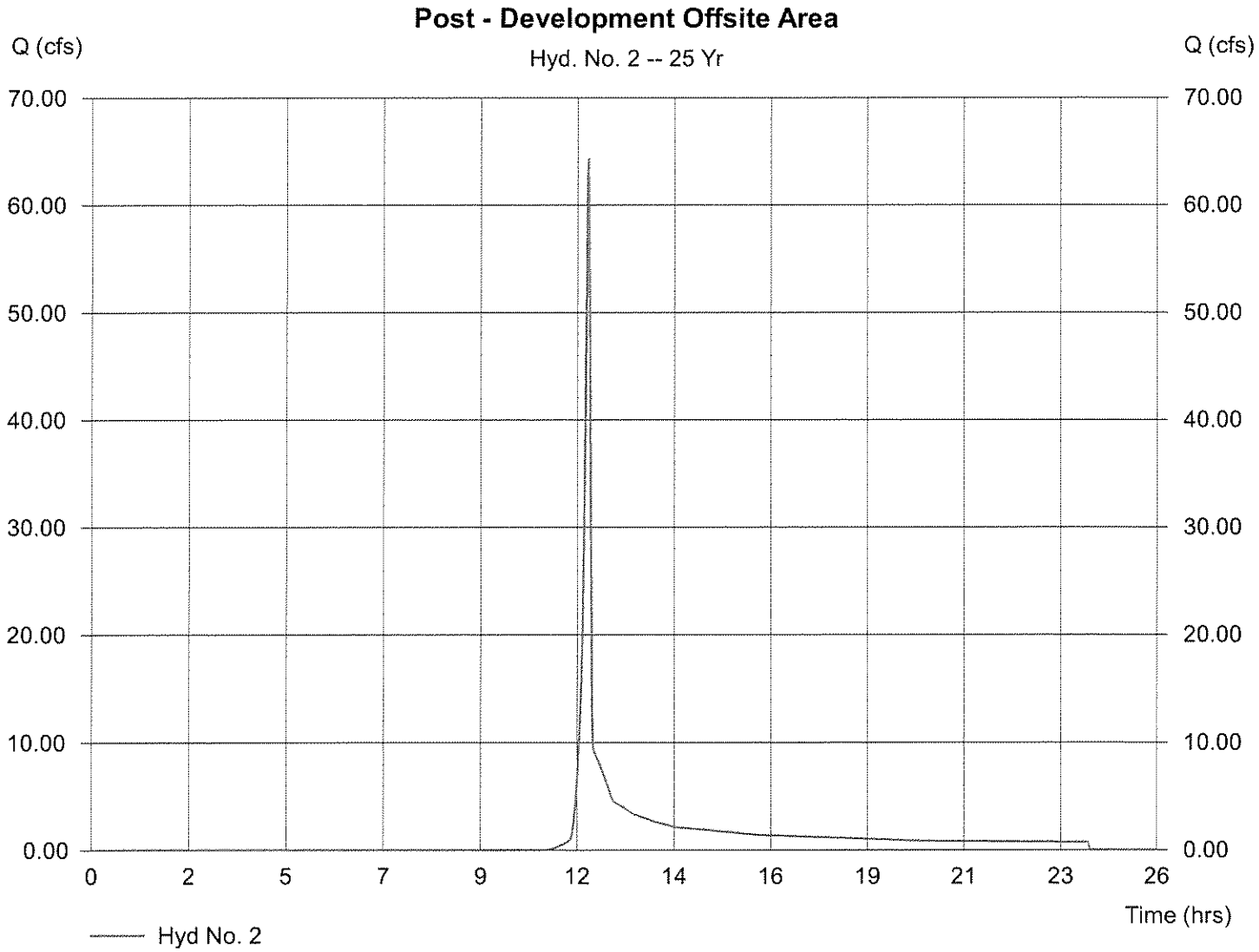
Tuesday, Sep 15 2020, 2:29 PM

Hyd. No. 2

Post - Development Offsite Area

Hydrograph type	= SCS Runoff	Peak discharge	= 64.28 cfs
Storm frequency	= 25 yrs	Time interval	= 1 min
Drainage area	= 20.960 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 2.80 min
Total precip.	= 5.10 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 112,171 cuft



TR55 Tc Worksheet

Hydraflow Hydrographs by Intelisolve

Hyd. No. 2

Post - Development Offsite Area

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.011		0.011		0.011		
Flow length (ft)	= 50.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 3.00		0.00		0.00		
Land slope (%)	= 2.00		0.00		0.00		
Travel Time (min)	**= 0.72**	**+**	**0.00**	**+**	**0.00**	**=**	**0.72**
Shallow Concentrated Flow							
Flow length (ft)	= 800.00		0.00		0.00		
Watercourse slope (%)	= 15.88		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	= 6.43		0.00		0.00		
Travel Time (min)	**= 2.07**	**+**	**0.00**	**+**	**0.00**	**=**	**2.07**
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	= 0.00		0.00		0.00		
Flow length (ft)	= 0.0		0.0		0.0		
Travel Time (min)	**= 0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 2.80 min

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	150.19	1	716	261,267	----	-------	-------	Pre - Development Offsite Area
2	SCS Runoff	100.85	1	716	175,488	----	-------	-------	Post - Development Offsite Area

Hydrograph Plot

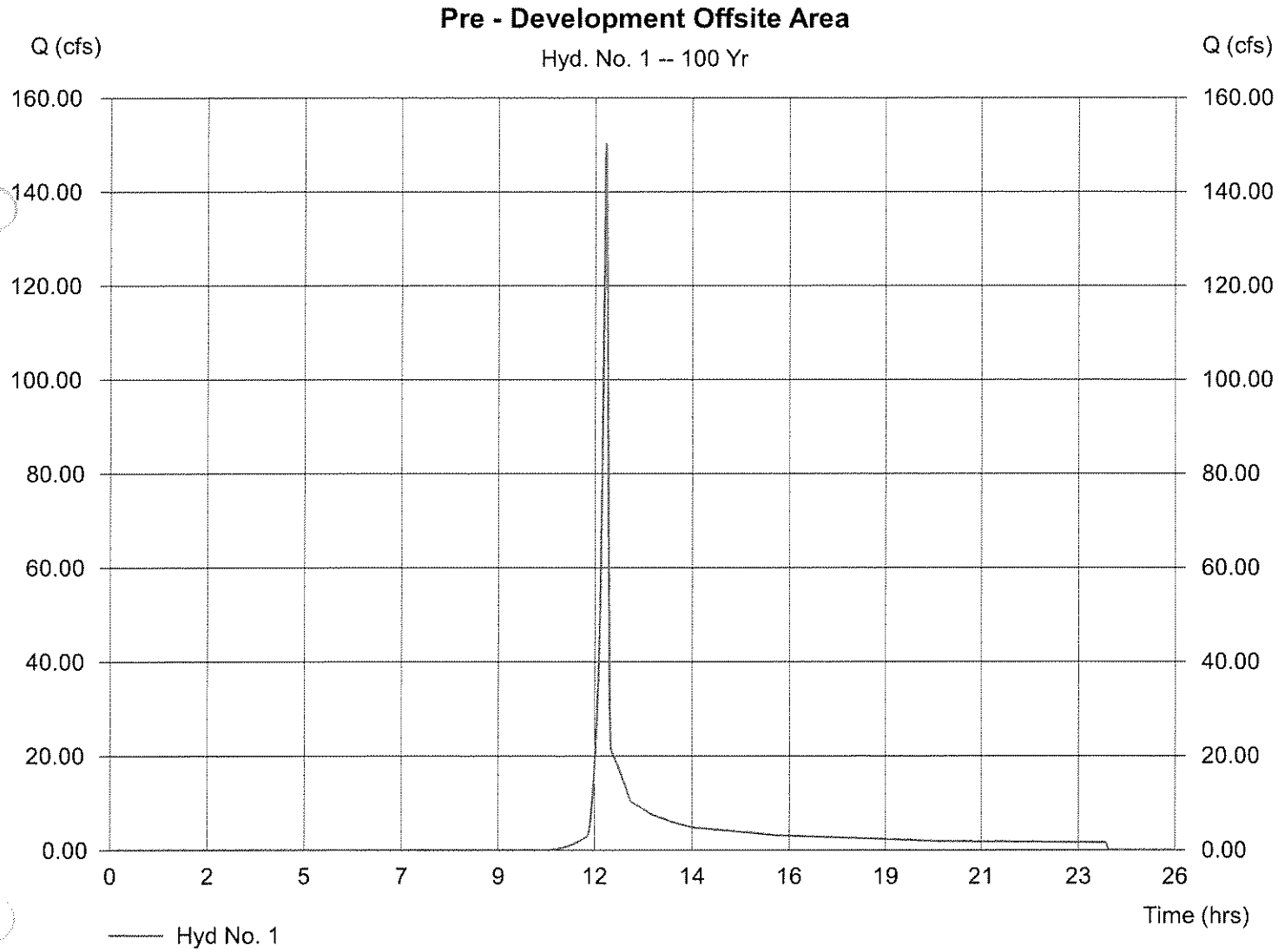
Hydraflow Hydrographs by Intelisolve | Tuesday, Sep 15 2020, 2:29 PM

Hyd. No. 1

Pre - Development Offsite Area

Hydrograph type	= SCS Runoff	Peak discharge	= 150.19 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 35.090 ac	Curve number	= 60
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 2.80 min
Total precip.	= 6.40 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 261,267 cuft



TR55 Tc Worksheet

Hyd. No. 1

Pre - Development Offsite Area

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.011		0.011		0.011		
Flow length (ft)	=	50.0		0.0		0.0		
Two-year 24-hr precip. (in)	=	3.00		0.00		0.00		
Land slope (%)	=	2.00		0.00		0.00		
Travel Time (min)	**=**	**0.72**	**+**	**0.00**	**+**	**0.00**	**=**	**0.72**
Shallow Concentrated Flow								
Flow length (ft)	=	800.00		0.00		0.00		
Watercourse slope (%)	=	15.88		0.00		0.00		
Surface description	=	Unpaved		Paved		Paved		
Average velocity (ft/s)	=	6.43		0.00		0.00		
Travel Time (min)	**=**	**2.07**	**+**	**0.00**	**+**	**0.00**	**=**	**2.07**
Channel Flow								
X sectional flow area (sqft)	=	0.00		0.00		0.00		
Wetted perimeter (ft)	=	0.00		0.00		0.00		
Channel slope (%)	=	0.00		0.00		0.00		
Manning's n-value	=	0.015		0.015		0.015		
Velocity (ft/s)	=	0.00		0.00		0.00		
Flow length (ft)	=	0.0		0.0		0.0		
Travel Time (min)	**=**	**0.00**	**+**	**0.00**	**+**	**0.00**	**=**	**0.00**

Total Travel Time, Tc ..... 2.80 min

Hydrograph Plot

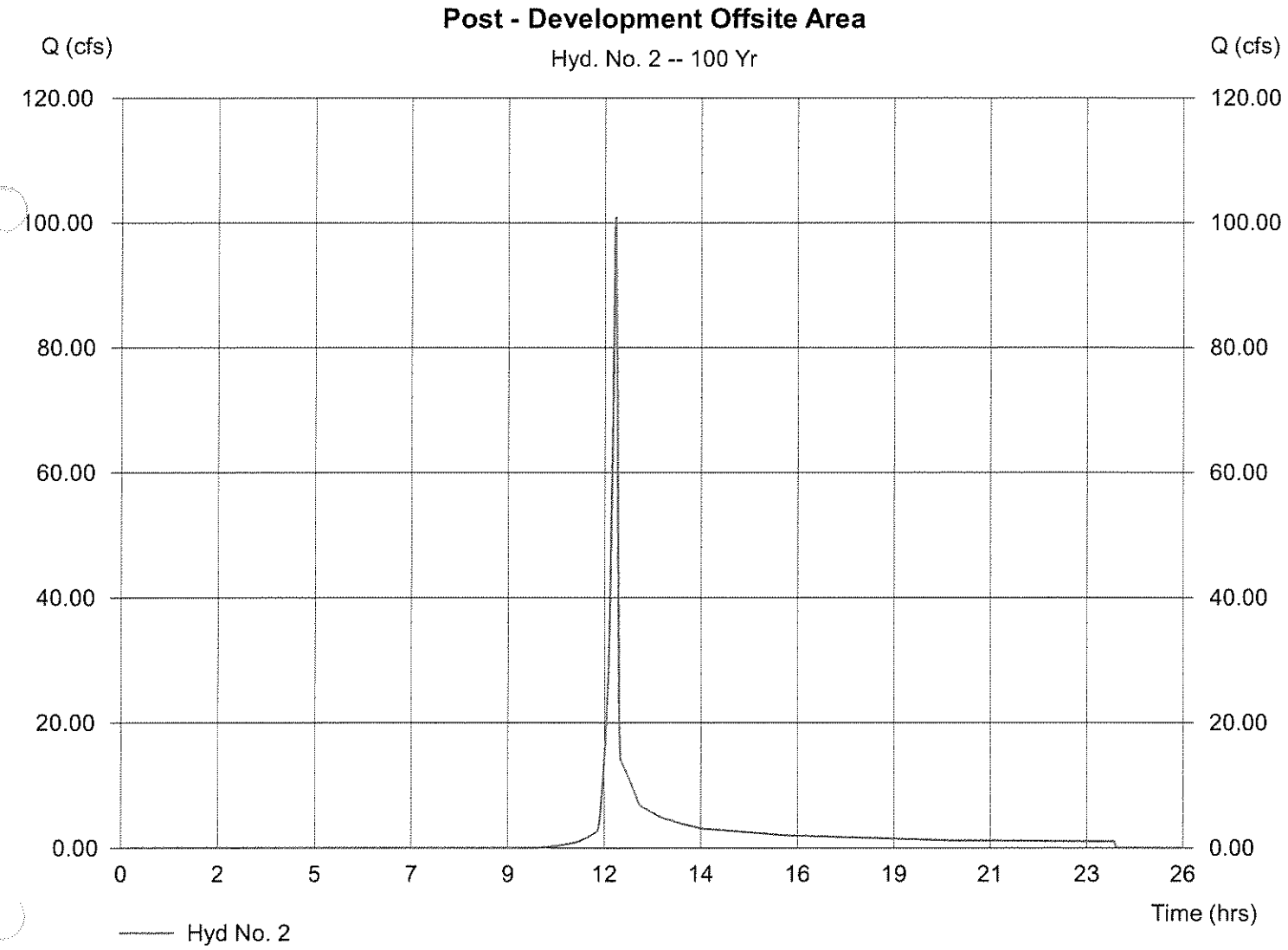
Hydraflow Hydrographs by Intelisolve | Tuesday, Sep 15 2020, 2:29 PM

Hyd. No. 2

Post - Development Offsite Area

Hydrograph type	= SCS Runoff	Peak discharge	= 100.85 cfs
Storm frequency	= 100 yrs	Time interval	= 1 min
Drainage area	= 20.960 ac	Curve number	= 63
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 2.80 min
Total precip.	= 6.40 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 175,488 cuft



TR55 Tc Worksheet

Hyd. No. 2

Post - Development Offsite Area

Description	A	B	C	Totals
Sheet Flow				
Manning's n-value	= 0.011	0.011	0.011	
Flow length (ft)	= 50.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.00	0.00	0.00	
Land slope (%)	= 2.00	0.00	0.00	
Travel Time (min)	**= 0.72**	**+ 0.00**	**+ 0.00**	**= 0.72**
Shallow Concentrated Flow				
Flow length (ft)	= 800.00	0.00	0.00	
Watercourse slope (%)	= 15.88	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	= 6.43	0.00	0.00	
Travel Time (min)	**= 2.07**	**+ 0.00**	**+ 0.00**	**= 2.07**
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	= 0.00	0.00	0.00	
Flow length (ft)	= 0.0	0.0	0.0	
Travel Time (min)	**= 0.00**	**+ 0.00**	**+ 0.00**	**= 0.00**

Total Travel Time, Tc ..... 2.80 min

WORKSHEET 4. CHANGE IN RUNOFF VOLUME FOR 2-YEAR STORM EVENT

REVISED 11-29-16

PROJECT: Offsite Area
DA: LOD
2-Year Rainfall: 3 in (Per NOAA Atlas 14)

Total Site Area: Northern acres
Protected Site Area: -- acres
Managed Area: -- acres

Existing Conditions:

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia (0.2*S)	Q Runoff[1] (in)	Runoff Volume[2] (ft³)
Meadow	B	759686	17.44	61	6.39	-	0.37	23114
Impervious	B	59677	1.37	98	0.20	-	2.77	13766
Woods	B	709157	16.28	55	8.18	-	0.19	11512
TOTAL:		1528520	35.09					48392

Developed Conditions:

Cover Type/Condition	Soil Type	Area (sf)	Area (ac)	CN	S	Ia (0.2*S)	Q Runoff[1] (in)	Runoff Volume[2] (ft³)
Open Space	B	471319	10.82	61	6.39	-	0.37	14340
Impervious	B	97574	2.24	98	0.20	-	2.77	22508
Woods	B	344124	7.90	55	8.18	-	0.41	11731
TOTAL:		913018	20.96					48580

2-Year Volume Increase (ft³):	187

2-Year Volume Increase = Developed Conditions Runoff Volume - Existing Conditions Runoff Volume

1. Runoff (in) = Q = $(P - 0.2S)^2 / (P + 0.8S)$ where

   P = 2-Year Rainfall (in)

   S = (1000/ CN)-10

2. Runoff Volume (CF) = Q x Area x 1/12

   Q = Runoff (in)

   Area = Land Use Area (sq. ft)

Note: Runoff Volume must be calculated for EACH land use type/condition and HSGI. The use of a weighted CN value for volume calculations is not acceptable.

Appendix O

Construction Sequence

SEQUENCE OF CONSTRUCTION

*THIS REPLACES THE SEQUENCE OF CONSTRUCTION ON SHEET ES-19 OF THE SOUTHEASTERN REALIGNMENT MODIFICATION

The following is a sequential order for the construction of the permanent erosion and sedimentation control features associated with the Phase IV Modification, Cell 4F Minor Modification, The Southeastern Realignment Modification, and The Northern Realignment Modification. Temporary controls will be constructed at the appropriate stage of development, in accordance with the staging drawings.

A pre-construction meeting is required prior to initiating construction of the cells. The following will be notified for attendance:

Landfill
PaDEP
Landfill engineering consultant
CQA representative
General Contractor
Geosynthetic Contractor
Lower Saucon Township

Following construction, a Form 37 Certification of Construction shall be prepared.

Cell 4-A Development LINER SYSTEM AND CELL DEVELOPMENT COMPLETED

Cell 4-B Development LINER SYSTEM AND CELL DEVELOPMENT COMPLETED

Cell 4-C Development LINER SYSTEM AND CELL DEVELOPMENT COMPLETED

Cell 4-D Development LINER SYSTEM AND CELL DEVELOPMENT COMPLETED

Cell 4-F Development LINER SYSTEM AND CELL DEVELOPMENT COMPLETED

Cell 4-E Development PARTIALLY CONSTRUCTED

1. Install and maintain silt fence around the perimeter of all areas that are to be disturbed.
2. Install and maintain rock construction entrances on access roadways.
3. Provide all necessary maintenance within Sedimentation Basins 2, 3, 4, and 6 including sediment clean out.
4. Construct Channel B and upgrade Basin 4.
5. Construct Culverts C-8 and Inlet 2, Culvert C-18, Channel C-1 and Culvert C-20, MH4, Inlet 13 and Channel 5.
6. Begin cell excavation.
7. Upon completion of cell construction, begin disposal within cell, constructing benches every 25 feet of vertical elevation, extending downslope drain (DS) as necessary.
8. Provide permanent/temporary seeding as required.

Phase III / IV Cell Overtopping (COMPLETE)

1. Overtopping requires no additional cell development, nor BMP development within the area of overtopping. Existing BMP's onsite provide for erosion and sediment control for overtopping.

Cell SE1-A Development (PARTIALLY COMPLETE)

1. Install and maintain Woodland Protection fence and silt fence around the areas that are to be disturbed.
2. Install and maintain rock construction entrances on access roadways.
3. Provide all necessary maintenance within Sedimentation Basins #1 & #2, including sediment cleanout.
4. Modify existing Basin #2.

5. Begin Cell SE1-A Construction – MSE Berm, Construct Channel V, perimeter road, and citizen drop-off area.
6. Install a portion of Culvert C-24, including from Basin #2 to MH #12, and extend to temporary end of MSE Wall for future extension to I-16.
7. Upon completion of Cell Construction, begin disposal within cell, constructing benches every 25 feet of vertical elevation, extending downslope drain (DS) as necessary.
8. Provide permanent / temporary seeding as required.

Cell SE1-B Development (PARTIALLY COMPLETED)

1. Install and maintain Woodland Protection fencing around the perimeter of all areas that are to be disturbed.
2. Install and maintain rock construction entrances on access roadways.
3. Provide all necessary maintenance within Sedimentation Basins #1 & #2, including sediment cleanout.
4. Provide all necessary maintenance on Channels O, P, Q, N, and Culvert C-17.
5. Construct Channels W, X, Y including Culverts C-21 and C-21A with Inlet I-18.
6. Begin Cell SE1-B construction including perimeter road with development of Channel L ensuring Channel L "daylights" to temporary channels tributary to Basin #2.
7. Upon completion of Cell Construction, begin disposal within cell, constructing benches every 25 feet of vertical elevation, extending downslope drain (DS) as necessary.
8. Provide permanent / temporary seeding as required.

Cell SE-2A Development (PARTIALLY COMPLETED)

1. Install and maintain Woodland Protection fencing around the perimeter of all areas that are to be disturbed.
2. Install and maintain rock construction entrances on access roadways.
3. Provide all necessary maintenance within Sedimentation Basins #1 & #2, including sediment cleanout.
4. Construct Channel Z with outfall level spreader and Culvert C-26 with Inlet I-19.
5. Construct Channel N including Culvert C-25.
6. Relocate Culvert C-17 by installing Manholes #3, #10, and #11 including Culvert C-23 outletting to Channel C-25.
7. Install Culvert C-22 and Inlet I-15.
8. Begin Cell SE2-A construction – MSE Berm, extending Channel V and Culvert C-24 to Inlet I-16, installing I-16. Construct Channels M and a portion of Channel L.
9. Upon completion of Cell Construction, begin disposal within cell, constructing benches every 25 feet of vertical elevation, extending downslope drain (DS) as necessary.
10. Provide permanent / temporary seeding as required.

Cell SE2-B Development (PARTIALLY COMPLETED)

1. Install and maintain silt fence around the perimeter of all areas that are to be disturbed.
2. Install and maintain rock construction entrances on access roadways.
3. Provide all necessary maintenance within Sedimentation Basins #1 and #2, including sediment clean out.
4. Begin Cell SE2-B construction – perimeter road extending Channel L to the section of Channel L constructed during Cell SE1-B development.
5. Upon completion of cell construction, begin disposal within cell, constructing benches every 25 feet of vertical elevation, extending downslope drain (DS) as necessary.
6. Provide permanent / temporary seeding as required.

Cell NR-1 Development (Begin Summer 2022, Completed Summer 2025)

1. Install and maintain Woodland Protection fencing around the perimeter of all areas that are to be disturbed.
2. Install and maintain rock construction entrances on access roadways.
3. Provide all necessary maintenance within Sedimentation Basins #1 & #2, including sediment cleanout.
4. Provide all necessary maintenance on Channels M, N, Z, DS-6, Inlet I-19, and Culvert C-17.
5. Begin MSE Wall Construction including the Construction of Channel CC.
6. Begin Cell NR-1 construction including perimeter road with development of Temporary Stormwater Channels as necessary. Ensure all construction areas tributary to Basin #2 is directed to Basin #2.

7. Upon completion of Cell Construction, begin disposal within cell, constructing benches every 25 feet of vertical elevation, extending downslope drain (DS) as necessary.
8. Provide permanent / temporary seeding as required.

Cell NR-2 Development (Begin Spring 2025, Completed Summer 2026)

1. Install and maintain Woodland Protection fencing around the perimeter of all areas that are to be disturbed.
2. Install and maintain rock construction entrances on access roadways.
3. Provide all necessary maintenance within Sedimentation Basins #1 & #2, including sediment cleanout.
4. Provide all necessary maintenance on Channels M, N, Z, CC, DS-6, DS-8, Inlet I-19, and Culvert C-17.
5. Begin MSE Wall Construction including the Construction of Channel CC and BB.
6. Begin Cell NR-2 construction including perimeter road with development of Temporary Stormwater Channels as necessary. Ensure all construction areas tributary to Basin #2 is directed to Basin #2.
7. Upon completion of Cell Construction, begin disposal within cell, constructing benches every 25 feet of vertical elevation, extending downslope drain (DS) as necessary.
8. Provide permanent / temporary seeding as required.

Cell NR-3 Development (Begin Spring 2026, Completed Summer 2028)

1. Install and maintain Woodland Protection fencing around the perimeter of all areas that are to be disturbed.
2. Install and maintain rock construction entrances on access roadways.
3. Provide all necessary maintenance within Sedimentation Basins #1 & #2, including sediment cleanout.
4. Provide all necessary maintenance on Channels M, N, Z, BB, CC, DS-6, DS-8, DS-9, Inlet I-19, and Culvert C-17.
5. Begin MSE Wall Construction including the Construction of Channel AA and BB.
6. Begin Cell NR-3 construction including perimeter road with development of Temporary Stormwater Channels as necessary. Ensure all construction areas tributary to Basin #2 is directed to Basin #2.
7. Upon completion of Cell Construction, begin disposal within cell, constructing benches every 25 feet of vertical elevation, extending downslope drain (DS) as necessary.
8. Provide permanent / temporary seeding as required.