STORMWATER POLLUTION PREVENTION PLAN

For Stormwater Discharges Associated with Industrial Activity
Sector J – Mineral Mining
Sector P – Land Transportation and Warehousing

Chester Hill Holding Mine
Black Meadow Road
Town of Chester
Orange County, New York

Prepared For:

Chester Hill Holding Company, Inc.
PO Box 1351
Greenwood Lake, NY 10925

Prepared by:

Roy T. Budnik & Associates, Inc.
317 Main Street
Poughkeepsie, NY 12601

June 28, 2012
Rev: June 25, 2018

Emergency Contact Numbers
Frank Lotito 845-222-6556
Orange County Emergency Response: 911
DEC Spill Hotline 1-800-457-7362

PLAN CERTIFICATION

I certify under penalty of law 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 person(s) directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature: _____

Name: Frank Lotito

Title: President

Date: 6-29-18

Table of Contents

Plan Certification
1.0 Introduction 1
1.1 Current Status 1
1.2 Permit Coverage 1
1.3 Facility Information 2
2.0 Pollution Prevention Team 3
3.0 Site Description 3
3.1 Activities at Site 3
3.2 General Location Map 3
3.3 Site Description 4
3.3.1 Current Land Use 4
3.3.2 Topography 4
3.3.3 Soils 4
3.4 Stormwater Flow 4
3.5 Receiving Waters 4
3.6 Municipal separate storm sewer systems 5
3.7 Other SPDES Permitted Discharges 5
3.8 Prohibited Discharges 5
3.8.1 General Prohibition 5
3.8.2 Sector-Specific Prohibitions 5
3.8.3 Authorized non-stormwater discharges 5
3.9 Impervious surface estimate 5
3.10 Documentation of Permit Eligibility Related to Endangered Species 6
3.11 Documentation of Permit Eligibility Related to Historic Places 6
4.0 Summary of Potential Pollutant Sources 6
4.1 Activities in Area 6
4.2 Pollutants 6
4.3 Potential for Presence in Stormwater 6
5.0 Spills and Releases 6
6.0 Monitoring, Reporting, and Retention of Records 7
6.1 Monitoring Requirements 7
6.1.1 Outfalls 7
6.1.2 Weekly Erosion and Sediment Control Measure Monitoring 7
6.1.3 Quarterly Visual Monitoring 8
6.1.4 Quarterly Routine Inspections 8
6.1.5 Annual Compliance Monitoring 8
6.1.6 Annual Dry Weather Flow Monitoring 8
6.1.7 Semi-Annual Benchmark Discharge Monitoring 9
6.2 Reporting Requirements 9
6.3 Retention of Monitoring Records 11
6.4 Corrective and Follow-up Actions 12
6.4.1. Stormwater Discharge 12
6.4.2. Non-Stormwater Discharge 12
6.4.3. Corrective Action Documentation 12

7.0 Stormwater Controls 13
7.1 Existing and Planned Non-Structural Best Management Practices 13
7.1.1 General Provisions 13
7.1.2. Mining (Sector J) Best Management Practices 14
7.1.3. Transportation (Sector P) Best Management Practices 15
7.2 Structural Best Management Practices 16
7.3 Erosion and Sediment Control Program 16
7.3.1 Program elements 16
7.3.2 Temporary Measures 16
7.3.3 Permanent Measures 17
7.4 Maintenance 17
7.4 Implementation Schedule, Maintenance, and Inspections .... **Error! Bookmark not defined.**
8.0 Non-Stormwater Discharges 18
8.1 Certification of Non-Stormwater Discharges 18
8.2 Allowable Non-Stormwater Discharges 18
8.2.1 Generally-authorized non-stormwater discharges 18
8.2.2 Sector-specific authorized non-stormwater discharges 18
9.0 Corrective Actions 19
9.1 Stormwater Discharges 19
9.2 Non-Stormwater Discharges 19
10.0 Facility Inspections 19
10.1 Routine Inspections 19
10.2 Annual Comprehensive Site Compliance Evaluation 20
10.2.1 Scope of Compliance Inspection and Evaluation 20
10.2.2 Compliance Inspection and Evaluation Report 20
10.2.3 Credit as a Routine Facility Inspection 21
10.3 Follow-up Actions 21
11.0 Signature and Plan Review 21
11.2 Required Modifications 22
12.0 Keeping SWPPP Current 23
12.1 Amendments 23
12.2 New Stormwater Discharges 23
13.0 Appendix
Appendix 13.1 Completed Reporting Forms
Annual Certification Reports w/ Discharge Monitoring Reports
Annual Dry Weather Flow Forms
Quarterly Visual Monitoring Forms
Annual Compliance Evaluation Reports
Appendix 13.2 Figures
Appendix 13.3 Forms & Work Sheets
Appendix 13.4 Monitoring Requirements
Quarterly Visual Monitoring
Annual Dry Weather Flow Monitoring
Annual Benchmark Discharge Monitoring
Monitoring Instructions
Appendix 13.6 Runoff Analysis

Stormwater Pollution Prevention Plan
Chester Hill Holding Mine
Town of Chester, Orange County

1.0 Introduction

1.1 Current Status

This report is submitted in support of the application for coverage under the State Mined Land Reclamation regulations for a shale mine on property owned by Chester Hill Holding on Black Meadow Road. This *Stormwater Pollution Prevention Plan* (SWPPP; the *Plan*) has been prepared to provide the Department with a description of the measures and procedures proposed to ensure that mining activities do not impact the quality or quantity of stormwater generated on site.

1.2 Permit Coverage

This *Plan* has been prepared as part of the application for a Mined Land Reclamation Permit at the site. Stormwater discharges from Mineral Mining sites (Sector J) and mines at which equipment is fuel and maintained (Sector P – Land Transportation and Warehousing) are eligible for coverage under the interim Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity (GP-0-17-004; the MSGP). This *Plan* has been prepared in accordance with the MSGP. A *Notice of Intent to Discharge* (NOIT) form has been prepared (see Appendix 13.1) to cover runoff from the haul road.

Sector J - Mineral Mining and Dressing

The requirements listed under this sector apply to stormwater discharges associated with industrial activity from active and inactive mineral mining and dressing facilities as identified by the SIC Major Group 14. The types of activities that permittees under Sector J are primarily engaged in are: exploring for minerals (e.g., stone, sand, clay, chemical and fertilizer minerals, non-metallic minerals, etc.); developing mines and the mining of minerals; mineral dressing, and nonmetallic mineral services. Most stormwater discharges subject to an existing effluent limitation guideline in 40 CFR Part 436 are not authorized by this permit, except for mine dewatering discharges composed entirely of stormwater or ground water seepage from construction sand and gravel, industrial sand, and crushed stone mining facilities.

Sector P - Land Transportation and Warehousing

The requirements listed under this section apply to stormwater discharges associated with industrial activity from land transportation and warehousing facilities (generally identified by SIC Code 4212), that have vehicle and equipment maintenance shops (vehicle and equipment rehabilitation, mechanical repairs, painting, fueling and lubrication) and/or equipment cleaning operations.

1.3 Facility Information

Contact Person:	Frank Lotito, Partner
Telephone Number	845-222-6556
Operating Schedule	7 am to 5 pm, Monday through Saturday
Number of Employees	variable
Average wastewater discharge	No wastewater to be discharged. Stormwater only from entrance road
SPDES permit #	to be determined
Activities at site	see Section 3.1
Other SPDES permitted discharges	none
Impervious surface estimate	< 0.5% (entrance road) on reclamation

2.0 Pollution Prevention Team

Mr. Frank Lotito will be the manager of the pollution prevention team. He will ensure that employees are familiar with the contents of this plan.

The team manager will designate a qualified person to conduct inspections and monitoring. The person may be either a facility employee or hired consultant who is familiar with the day-to-day operations associated with their assigned responsibilities at the facility. The qualified person possesses the knowledge and skills to assess conditions, operations and activities at the facility that could impact stormwater quality and can evaluate the effectiveness of control measures being implemented as part of the requirements of the permit. The team manager may designate more than one individual as the qualified person.

The person selected to inspect the erosion and sediment controls must be knowledgeable in the principles and practices of erosion and sediment control and must receive four (4) hours of Department-endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the qualified person shall receive four (4) hours of training, every three (3) years.

3.0 Site Description

3.1 Activities at Site

Mining (Sector J) activities on the property include:

a) Excavation and processing of shale;
b) Stockpiling of processed material and topsoil;
c) Outdoor loading of trucks;
d) Land reclamation activities;

Fuel Management (Sector P) activities on the property include:

e) Fuel Storage
f) Outdoor fueling of equipment
g) Maintenance and equipment repair.

3.2 General Location Map

The Chester Hill Holding property is located along Black Meadow Road, off Orange County Route 13, approximately 4,000 feet south of the Village of Chester in the Town of Chester, Orange County, New York (see *Vicinity Map*, Appendix 13.2). Access to the property is via an entrance road from Black Meadow Road.

The property is located in a commercial and industrial area of the town. The adjoining lands include industrial parks to the north and northwest, with mainly vacant and agricultural lands to the west, south, and east. The Town of Chester Town Hall and public library are situated across Kings Highway, about 1,800 feet to the east of the site. A lightly used, but active railroad freight line runs along the western boundary of the property.

3.3 Site Description

3.3.1 Current Land Use

The area to be affected is currently vacant. A State-permitted sand and gravel operation was active until the early 1990's. The southern and eastern parts of the property is wooded; the northern portion, including the former mine site, is rough grassland.

As part of its commercial facility, Waste Systems holds an easement on approximately 0.5 acres of the property, which contains the sanitary disposal system for that company (see *Mining Map*). There is an existing system and a reserve expansion area within the easement. The area containing the disposal system is currently crossed by the unpaved access road to the property; a proposed access road will bypass the area. The SDS will be fenced to protect it from truck traffic associated with the quarry.

3.3.2 Topography

The site occupies the eastern portion of Durland Hill, a broad, rounded feature that rises about 350 feet above the surrounding terrain. The highest point on the hill (elevation 843 feet asl) is located to the west of the site and will not be affected by mining.

The ground surface within the property slopes irregularly to the north, west, and south. Elevations at the western and northern property lines are at approximately 490 feet asl; the highest point on the property is about 715 feet asl, along the eastern property line.

3.3.3 Soils

The soil on the southern, higher portion of the property is mapped as Rock Outcrop-Nassau Complex–very steep (RSF), according to the Orange County Soil Survey (see *Soil Map*, Appendix 13.2). The northern, lower part of the property contains Mardin gravelly silt loam (MdC).

Rock Outcrop-Nassau Complex – composed of 60% rock outcrop, 30% Nassau shaly to very shaly silt loam, and 10% other soils. The soil is formed in thin (10-20 inches) glacial till over shale bedrock. It is in hydrologic group C, with a moderate erosion potential.

Mardin gravelly silt loam – a deep, relatively well-drained, sloping soil formed in glacial till. Bedrock is greater than 5 feet deep; a perched water table may be present seasonally. It is in hydrologic group C, with a slight erosion potential.

3.4 Stormwater Flow

Stormwater flows radially off the hill across the property to off-site discharge points via culverts under the railroad bed. There is little runon from adjacent areas because of the relatively high topographic position of the site. The permanent water table lies at about elevation 490 feet, based on the elevations of the wetland areas.

3.5 Receiving Waters

There are no streams within or contiguous to the area subject to this application. A small portion (1 acre) of State-regulated wetland WR-18 is located in the western portion of the property, adjacent to the railroad bed. State-regulated wetland WR-38 is located on the southwest side of Durland Hill.

The mine does not include any portion of either wetland or the adjacent areas. Small, non-State regulated wetland areas A, B, and C are situated in the vicinity of the entrance road (see *Site and Erosion Control Plan*).

3.6 Municipal separate storm sewer systems

The Town of Chester operates a separate storm sewer system under the MS4 program.

3.7 Other SPDES Permitted Discharges

No other SPDES-permitted discharges are proposed. The shale will be processed through a dry plant; no process water will be generated or released from the site.

3.8 Prohibited Discharges

3.8.1 General Prohibition

a) In all cases, any discharge which contains a visible sheen, foam, or odor, or may cause or contribute to a violation of water quality is prohibited.

b) Discharges of vehicle/equipment wash waters are not authorized and must be covered under a separate SPDES permit or discharged to a sanitary sewer in accordance with applicable industrial pretreatment requirements.

c) Stormwater discharges cannot be mixed with non-stormwater discharges, except as described in Section 3.8.3.

3.8.2 Sector-Specific Prohibitions

a) Sector J – discharges not covered by the General Permit include, but are not limited to: mineral wash water, transport (slurry) water, wet scrubber blowdown, contact cooling water, non-contact cooling water, floor and equipment washing, water used for dust suppression (except the discharge of clean water applied to roadways for dust control may be authorized provided that BMPs are in place to limit application rates thus minimizing surface runoff), cooling tower and boiler blowdowns, vehicle and equipment maintenance fluids, and intake water treatment backwashes. These discharges must be covered under a separate SPDES permit.

B) Sector P – The discharge of vehicle/equipment wash waters, including tank cleaning operations, are not authorized by this permit and must be covered under a separate SPDES permit or discharged to a sanitary sewer in accordance with applicable industrial pretreatment requirements

3.8.3 Authorized non-stormwater discharges

The discharge of clean water applied to roadways for dust control may be authorized by this permit at sites covered by Sector J, provided that BMPs are in place to limit application rates thus minimizing surface runoff.

3.9 Impervious surface estimate

The entire site is underlain by impervious shale; the shale will be exposed during the mining process, so that the entire active area at a given time (up to 8 acres) will be impervious. There are no existing or proposed constructed impervious surfaces within the mine area or impervious surfaces that will remain upon reclamation.

3.10 Documentation of Permit Eligibility Related to Endangered Species

The site has undergone review under SEQRA as part of the issuance of the mining permit for the property. No endangered species have been identified during the reviews.

3.11 Documentation of Permit Eligibility Related to Historic Places

The site has undergone review under SEQRA as part of the issuance of the mining permit for the property. No cultural resources, including historic places, have been identified during the reviews.

4.0 Summary of Potential Pollutant Sources

4.1 Activities in Area

Activities that may expose potential pollution sources to stormwater include:

a) Excavation and processing areas – Bare shale and stockpiles of processed shale in the active portion of the mine may contribute turbidity to stormwater runoff.
b) Truck and equipment operations – Puncture of fuel tanks and rupture of hydraulic hoses could result in spillage of fluids. Fluids could be released during maintenance and repair operations on the non-mobile mining equipment.
c) Equipment Fueling – There will be no bulk storage of petroleum products within the mining area. Mining equipment will be refueled as needed from truck-mounted tanks within the active mining area, which will change as mining activities progress.

4.2 Pollutants

The following potential source areas of storm water contamination were identified and evaluated:

a) Excavation and processing areas – Contaminants may contain volatile and semi-volatile petroleum distillates, ethylene glycol and sediments.
b) Truck and equipment operations – Leakage and spillage from tanks and hoses may contain volatile and semi-volatile petroleum distillates. Sediment may be tracked onto public roads by haul trucks leaving the site.
c) Equipment Fueling – Spillage of fuel due to overfilling, drips, and hose or valve failure may occur during fueling of the non-mobile equipment.

4.3 Potential for Presence in Stormwater

Truck and equipment operations will be conducted throughout the sequential 2-acre active portions of the mine. The pollutants identified in Section 4.2 have the potential for presence in stormwater as the result of leaks, spills, and turbidity. No bulk petroleum storage facilities will be operated at the mine; non-mobile equipment will be refueled from a truck-mounted fuel tank.

5.0 Spills and Releases

Spills or releases may occur on the property where equipment is operated or maintained. There will be no bulk storage facilities for petroleum products and waste fluids on the property (see the *Spill Prevention Plan*).

The *Spill Plan* provides specific measures to prevent, control, and cleanup spills and releases at the mine. No reportable spills or releases of petroleum and hazardous substances or other pollutants have been identified on the property. A list of reportable spills or releases will be added to this SWPPP, if and when they occur. Measures mandated by the Multi-Sector General Permit include:

A) Releases of Hazardous Substances or Petroleum

1) The General Permit does not authorize the discharge of hazardous substances or petroleum. The discharge of hazardous substances or petroleum in the stormwater discharge(s) from the facility shall be prevented or minimized in accordance with the stormwater pollution prevention plan and the Spill Plan for the facility.

2) **Any spill of petroleum must be reported to the NYSDEC Spills hotline (1-800- 457-7362) and the Town of Chester MS4 coordinator (Town Highway Superintendent; 845-469-4101) within two hours of the release**;

3) Following any release incident, the manager of the pollution prevention team will evaluate the facility's stormwater pollution prevention plan to identify measures preventing reoccurrence and to improve the emergency response to such releases. The plan must be modified where appropriate.

B) Cleanup Actions

All spilled or leaked substances must be removed as soon as practical, unless authorization is received from the Department. The MSGP does not relieve the Permittee of any reporting or other requirement related to spills or other releases of petroleum or hazardous substances. Following spill cleanup the affected area must be completely flushed with clean water three times and the water removed after each flushing for proper disposal in an on-site or off-site wastewater treatment plant designed to treat such water and permitted to discharge such wastewater Alternately, the permittee may test the first batch of stormwater following the spill cleanup to determine discharge acceptability. The stormwater sample must be analyzed for pH and any pollutants known or suspected to be present in the spilled materials. If the water contains no pollutants it may be discharged, otherwise it must be disposed of as noted above.

6.0 Monitoring, Reporting, and Retention of Records

6.1 Monitoring Requirements

6.1.1 Outfalls

Outfall #001 will discharge stormwater runoff from the access road to an existing catch basin (see enclosed *Site and Erosion Control Plan*). The proposed outfall will be monitored as described in this Section. Stormwater falling within the active mining area will be directed a retention pond that is designed to hold runoff from the 100-year, 24-hour storm event.

6.1.2 Weekly Erosion and Sediment Control Measure Monitoring

For sites where soil disturbance activities are on-going, the qualified person shall conduct a site inspection at least once every seven (7) calendar days. Where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and temporary stabilization has been applied to all disturbed areas or if runoff is unlikely due to winter conditions (e.g., site is covered with snow, ice, or the ground is frozen), the qualified person shall conduct a site inspection at least once every thirty (30) calendar days. Site inspections shall be conducted of areas with the potential to discharge to surface waters of the State as follows:

a) All erosion and sediment control practices in areas with potential for stormwater discharge to surface water, to ensure integrity and effectiveness to ensure that practices are constructed as indicated in the SWPPP.

b) All areas of disturbance in areas with potential for stormwater discharge to surface water that have not achieved final stabilization;

c) All points of discharge to natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the mine.
d) All points of discharge.

6.1.3 Quarterly Visual Monitoring

a) A quarterly visual examination must be performed and documented of a stormwater discharge from each outfall during a qualifying storm event unless there is no discharge from an outfall during a qualifying storm event. The storm event information must be recorded using a Department-provided form available at http://www.dec.ny.gov/chemical/9009.html. If no qualifying storm event resulted in runoff from the facility during a monitoring quarter, documentation must be included with the SWPPP. The examination must be made at least once in each of the following quarters:

- o January 1st through March 31st,
- o April 1st through June 30th,
- o July 1st through September 30th, and
- o October 1st through December 31st

. No analytical tests are required to be performed on the samples for the purpose of meeting the visual monitoring requirements. The examination must be performed in accordance with the methods in Appendix 13.5.

b) If the visual examination indicates the presence of stormwater pollution (for example: color, odor, floating solids, settled solids, suspended solids, foam, oil sheen, or other indicators), the permittee must evaluate the facility for potential sources of stormwater contamination. Any sources of contamination that are identified must be remedied as required in Section 10.2. Such remedies may include implementation of non-structural or structural BMPs to prevent recurrence. The facility's SWPPP must be updated to reflect these revisions within 14 days of the inspection for items that can be readily resolved. More complicated maintenance or repairs shall be performed in accordance with the timeframes for more complicated maintenance and repairs described under Section 7.3 - *Maintenance* or Section 10.2 - *Follow-up Actions*.

c) Results of the visual examination must be documented on the Department-provided form (available at http://www.dec.ny.gov/chemical/9009.html) and maintained on-site with the *Stormwater Pollution Prevention Plan* (SWPPP). The report must include the outfall location, the examination date and time, examination personnel, the nature of the discharge (i.e., runoff or snow melt), visual quality of the stormwater discharge (including observations of color, odor, clarity, floating solids, settled solids, suspended solids, foam, oil sheen, and other obvious indicators of stormwater pollution), probable sources of any observed stormwater contamination, and actions taken to eliminate these sources.

6.1.4 Quarterly Routine Inspections

Routine inspections must be conducted at least once each quarter (Jan-Mar; Apr-Jun; Jul-Sep; Oct-Dec) in a calendar year. See Section 10.1 for monitoring protocol.

6.1.5 Annual Compliance Monitoring

A site compliance evaluation (inspection) must be conducted at least once a calendar year. See Section 10.2 for monitoring protocol.

6.1.6 Annual Dry Weather Flow Monitoring

a) The permittee must perform and document at least one dry weather flow inspection each year after at least three (3) consecutive days of no precipitation. The dry weather flow inspection shall be conducted to determine the presence of non-stormwater discharges to the stormwater

drainage system. The examination must be performed in accordance with the methods in Appendix 13.5.

b) If a non-stormwater discharge is discovered, the Permittee shall identify its source to determine whether it is an authorized discharge (for example: a discharge covered by another SPDES permit) or an authorized non-stormwater discharge. The Permittee shall modify the SWPPP to address any newly identified allowable non-stormwater discharges that were not previously certified.

c) The Permittee shall notify the Department within 14 days of any non-authorized discharge that cannot be easily eliminated. Appropriate actions may require coverage under an individual, industrial SPDES permit or connection to the sanitary sewer system.

d) Results of the dry weather flow inspections must be documented and certified on Worksheet #5 (Appendix 13.4) and the records retained on-site with this Plan (Appendix 13.1). The report must include the outfall locations inspected, the inspection date and time, inspection personnel, description of discharges identified, the source of any discharges and actions taken to address any newly identified allowable non-stormwater discharges or elimination of non-authorized discharges.

6.1.7 Semi-Annual Benchmark Discharge Monitoring

a) Benchmark monitoring must be performed twice annually during the calendar year.

Period 1 - January 1^{t} through June 30
Period 2 - July 1 through December 31

The methodology for this monitoring is contained in Appendix 13.4.

b) The discharge limits presented in Appendix 13.4 are intended as a guideline for the permittee to determine the overall effectiveness of the SWPPP in controlling the discharge of pollutants. The concentrations do not constitute direct numeric effluent limitations; a benchmark exceedance, therefore in and of itself, is not a permit violation. It does, however, signal the need for the permittee to evaluate potential sources of stormwater contaminants at the facility. Any sources of contamination that are identified must be remedied as required under Sections 7.4 – *Implementation Schedule, Maintenance, and Inspections* or 10.2 – *Follow-up Actions*. If corrective actions at a facility do not result in achieving benchmark monitoring cut-off concentrations, the facility must continue efforts to implement additional BMPs. Failure to undertake and document the review or take the necessary corrective actions are violations of the Permit. Continued exceedance of benchmark monitoring cut-off concentrations may identify facilities that would be more appropriately covered under an individual SPDES Permit.

c) Samples must be collected in accordance with Appendix 13.4. Monitoring results must be reported in accordance with Section 6.2 and retained in accordance with Section 6.3.

d) If no qualifying storm event resulted in runoff from the facility during a monitoring period, documentation must be included with the SWPPP.

6.2 Reporting Requirements

Monitoring results from the outfalls will be reported as described in this Section.

1) Quarterly Visual Monitoring – Retain documentation with SWPPP. Answer applicable questions on the Annual Certification Form (Appendix 13.4).

2) Dry Weather Flow Inspection – Retain documentation with SWPPP. Answer applicable questions on the Annual Certification Form (Appendix 13.4).
3) Semi-Annual Benchmark Monitoring – Benchmark monitoring analysis results must be submitted electronically using the DEC electronic *Discharge Monitoring Report* (DMR) reporting system. All DMRs must be received by the Department 28 days after the end of the monitoring period. Monitoring periods and reporting deadlines are:
   Period 1 - *DMR* must be received electronically using the DEC electronic reporting system no later than July 28th following the end of reporting Period 1 - January 1 to June 30.
   Period 2 - *DMR* must be received electronically using the DEC electronic reporting system no later than January 28th following the end of reporting Period 2 - July 1 to December 31.
4) Weekly Erosion and Sediment Control Measure Inspections – Retain documentation with SWPPP.
5) Annual Compliance Monitoring – Retain documentation with SWPPP for at least one year from the date the Permit expires or is terminated. Answer applicable questions on the Annual Compliance Monitoring Form (Appendix 13.4) and submit by January 28th.
6) Annual Certification Report – The annual certification report is the primary mechanism for reporting to the Department. The ACR must be submitted using the DEC electronic reporting system.
   - An ACR covering January 1 to December 31 must be received by the Department on an annual basis by January 28 of the following calendar year.
   - Prior to December 20, 2020, the ACR may be submitted to the Department by mailing a paper form to the address listed on the form or by using the Department's online ACR.

   Beginning December 21, 2020 and in accordance with the EPA's NPDES Electronic Reporting Rule, the ACR must be submitted electronically using the Department's online ACR. Both versions of the ACR are located on the DEC website (http://www.dec.ny.gov/).
7) Additional reporting In addition to filing the annual certification reports and discharge monitoring reports, permittees with at least one stormwater discharge associated with industrial activity through a municipal separate storm sewer system (MS4), must submit signed copies of annual certification reports and discharge monitoring reports to the MS4 operator at the same time. The site will discharge to an MS4 system operated by the Town of Chester.

Monitoring/Report Submission Deadlines	
Monitoring type	**Submission Deadline**
Quarterly Visual Monitoring, Quarterly Routine, & Annual Compliance Inspections	Retain documentation on-site with SWPPP.
Corrective Action Documentation	Retain documentation on-site with SWPPP.
Dry Weather Flow Inspection	Retain documentation on-site with SWPPP.
Weekly BMP Inspections	Retain documentation on-site with SWPPP.
Annual Certification Report	Report must be received in the *Department*'s Central Office no later than January 28 of the year following the reporting period.
Semi-Annual Benchmark Monitoring	Period 1 - *DMR* must be received electronically using EPA's electronic reporting system no later than July 28 following the end of reporting Period 1 - January 1 to June 30. Period 2 - *DMR* must be received electronically using EPA's electronic reporting system no later than January 28 following the end of reporting Period 2 - July 1 to December 31.

6.3 Retention of Monitoring Records

Records generated from monitoring of the outfall will be retained as described in this Section.

1) Stormwater Pollution Prevention Plan (SWPPP) The permittee shall retain the SWPPP until at least one year after coverage under this Permit terminates. The permittee shall retain all records of monitoring information, copies of all reports required by this permit, and records of all data used to complete the NOIT form to be covered by this permit, until at least one year after coverage under this Permit terminates. This period may be explicitly modified by or extended by request of the Department at any time; and

2) Recording of Monitoring Activities and Results

a) The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by a SPDES permit, and records of all data used to complete the application for the permit, for a period of at least 5 years from the date of the sample, measurement, report or application.

b) Records of monitoring information shall include:

(1) the date, exact place, and time of sampling or measurements;
(2) the individual(s) who performed the sampling or measurements;
(3) the date(s) analyses were performed;
(4) the individual(s) who performed the analyses;
(5) the analytical techniques or methods used;
(6) the results of such analyses; and
(7) quality assurance/quality control documentation.

c) When records are stored electronically, the records must be preserved in a manner that reasonably assures their integrity and are acceptable to the Department. Such records must also be in a format which is accessible to the Department.

d) The permittee shall make available to the Department for inspection and copying or furnish to the Department within 25 business days of receipt of a Department request for such information, any information retained in accordance with this subdivision.

3) Monitoring and Sampling Data

The SWPPP must include"

a) A summary of existing stormwater discharge sampling data taken at the facility.
b) Chain of Custody Records for samples collected and transported to an approved laboratory.
c) Laboratory reposts of results for sample analyses.
d) Quarterly Visual monitoring Reports and Annual Comprehensive Compliance Reports.
e) Copies of Discharge Monitoring Reports (DMR).
f) Copies of Annual Certification Reports (ACR)
A summary of all stormwater sampling data collected during the term of this permit.

6.4 Corrective and Follow-up Actions

6.4.1. Stormwater Discharge

When the visual examination indicates the presence of pollution or when the benchmark limit sample results indicate exceedances of the pollutants, the owner or operator must:

a) Inspect the facility for potential sources of stormwater contamination;
b) Implement additional non-structural and/or structural BMPs to address any sources of contamination that are identified to prevent recurrence within the following timeframes:
   (i) The implementation must be completed before the next anticipated storm event, if practicable, but not more than 12 weeks after discovery.
   (ii) If implementation will take longer than 12 weeks, the owner or operator must submit a proposed schedule for completion of the project and obtain a written approval from the Regional Water Engineer.
c) Revise the facility's SWPPP in accordance with Part III.E; and,
d) Continue efforts to implement additional BMPs at the facility if corrective actions do not result in achieving benchmark monitoring cut-off concentrations..

6.4.2. Non-Stormwater Discharge

If a non-stormwater discharge is discovered the owner or operator must:

a) Identify its source and determine whether it is an authorized discharge.
b) Upon determination that the discharge is not covered under this permit or another SPDES permit, the owner or operator shall notify the Regional Water Engineer of the unauthorized discharge and begin immediate actions to eliminate the discharge. These actions must be documented in the SWPPP.
c) Upon determination that the discharge is an authorized non-stormwater discharge identified in Section 8.0 that were not previously certified, the owner or operator shall update the discharge certification and keep with the SWPPP.

6.4.3. Corrective Action Documentation

Owners or operators must document the existence of any of the conditions listed above within 24 hours of becoming aware of such condition. Unless otherwise required or as requested by the Department, the corrective action documentation is not required to be submitted and should be kept with the facility's SWPPP. Include the following information in your documentation:

a) A description of the condition triggering the need for corrective actions.
b) For any spills or leaks, include the following information: a description of the incident including material, date/time, amount, location, and reason for spill, and any leaks, spills or other releases that resulted in discharges of pollutants to waters of the state, through stormwater or otherwise;
c) Date the condition was identified;

d) The date when each corrective action was initiated and completed (or is expected to be completed);
e) A description of the corrective actions to minimize or prevent the discharge of pollutants.
f) For any spills or leaks, include response actions, the date/time clean-up completed, notifications made, and staff involved.
g) Also include any control measures taken to prevent the reoccurrence of such releases; and

A statement, signed and certified in accordance with Section 11 of the SWPP.

7.0 Stormwater Controls

7.1 Existing and Planned Non-Structural Best Management Practices

7.1.1 General Provisions

a) Good Housekeeping
   1) The permittee must keep all exposed areas of the facility in a clean, orderly manner where such exposed areas could contribute pollutants to stormwater. Common problem areas include equipment parking and repair sites, unreclaimed portions of the mine which are susceptible to erosion, and discharge points for mine-dewatering operations (if any). Measures must also include a schedule for regular pickup and disposal of garbage and waste materials, routine inspections for leaks, and evaluation of conditions of drums, tanks and containers.
   2) Dry absorbent clean up methods are used to contain or dispose/recycle residual liquids originating from recyclable containers.
   3) Material storage areas – Storage vessels of all materials (e.g., for used oil/oil filters, spent solvents, paint wastes, hydraulic fluids) are maintained in good condition, so as to prevent contamination of stormwater, and plainly labeled (e.g., "used oil," "spent solvents," etc.). Indoor storage is provided for fresh and waste fluids and filters.

b) Minimizing exposure – Where practicable, industrial materials and fine granular solids (such as cement) should be protected by a storm-resistant shelter to prevent exposure to rain, snow, snowmelt, or runoff. These materials shall be stored in enclosed silos or hoppers, buildings, or under other covering, as appropriate. No significant quantities of industrial materials or fine, granular solids are stored on site.
c) Test, maintain, and repair all industrial equipment and systems – The permittee has a preventive maintenance program that includes timely inspection and maintenance of stormwater management devices (for example: repairing berms), as well as inspection, testing, maintenance and repairing of facility equipment and systems to avoid breakdowns or failures that could result in discharges of pollutants to surface waters.
d) Spill prevention and response procedures – The procedures and necessary spill response equipment are available to those employees who may cause or detect a spill or leak. Spill kits are available on site for use in response to a petroleum spill or leakage. See *Spill Prevention Plan* under separate cover.
e) Routine facility inspections – In addition to or as part of the comprehensive site evaluation, qualified facility personnel must inspect all areas of the facility where industrial materials or activities are exposed to stormwater. The inspections must include an evaluation of the existing stormwater management measures. Inspections shall take place while the facility is in operation and shall include all of the following areas that may be exposed to stormwater: excavation and processing areas, storage tanks and drums, and equipment cleaning and maintenance areas.

f) Employee training – Topics to be covered in the employee training program must, at a minimum, include the following areas when applicable to a facility:
- spill prevention and response
- good housekeeping practices
- material management practices
- how to recognize unauthorized incoming waste and discharges
- how to evaluate the condition and maintenance needs of stormwater controls and equipment that may contribute to contamination of stormwater if not functioning properly
- purpose of SWPPP
- proper sampling procedures
- proper reporting procedures
- how to identify when corrective actions are needed
- proper handling (collection, storage, and disposal) of all fluids
- erosion and sediment control

Every employee will receive such training at least annually. Employee training must be provided for all employees who work in areas where industrial materials or activities are exposed to stormwater, and for employees who are responsible for implementing activities identified in, the SWPPP (for example: inspectors, sampling personnel, maintenance people). The training should inform employees of the components and goals of the SWPPP.

g) Limiting dust-suppression application rates – signs along the driveway will state that the speed limit is 15 mph on the property to limit production of fugitive dust. Water or Department-approved dust suppressants is applied only at rates sufficient to control fugitive dust generated by traffic on the driveway to eliminate runoff and track-out onto Black Meadow Road.

h) Eliminate non-stormwater discharges not authorized by the general stormwater permit or another SPDES permit – Non-stormwater discharges not listed in Section 8.2 of this SWPPP or authorized by another SPDES permit are unlawful and must be terminated.

i) Insure that waste, garbage, and floatable debris are not released to receiving waters – Inspect the site daily for such materials. Collect any waste and place in proper solid waste dumpster for disposal offsite.

j) Stabilize exposed areas and contain runoff – Continue sequential reclamation to minimize exposed areas, as detailed in the *Mining and Reclamation Plan* (under separate cover).

k) Divert, infiltrate, reuse, or otherwise contain stormwater to minimize pollutants in discharges – direct stormwater runoff from exposed areas to internal retention ponds, using structural measures described in Section 7.2.

l) Deicing Salt – Enclose or cover storage piles of salt or piles containing salt used for deicing or other commercial or industrial purposes, including maintenance of paved surfaces.

m) Benchmark Monitoring. See Appendix 13.5 for list of analytes and cut-off concentrations..

7.1.2. Mining (Sector J) Best Management Practices

Additional sector-specific practices include, but are not limited to the following:

a) Routine Inspections – All stormwater management practices shall be inspected quarterly. The inspection program shall, at a minimum, include: assessment of the integrity of stormwater discharge diversions, conveyance systems, sediment control and collection systems and containment structures; inspections to determine if soil erosion has occurred at, or as a result of vegetative measures, serrated slopes and benched slopes; inspections of material handling and chemical storage areas, vehicle and equipment maintenance areas, fueling areas, and

other actual or potential sources of pollution for evidence of discharges of contaminated stormwater. See Section 6.1.5 for inspection protocol and Section 7.3.1 for erosion and sediment control best management practices.

b) Stabilize exposed areas and contain runoff – Continue sequential reclamation to minimize exposed areas, as detailed in the *Mining and Reclamation Plan* (under separate cover).

c) Mine Dewatering – Mine dewatering operations are not conducted at the site. Numerical Effluent Limitations are not applicable.

7.1.3. Transportation (Sector P) Best Management Practices

Additional sector-specific practices include, but are not limited to the following:

a) Vehicle and equipment storage areas:
   1) The storage of mobile vehicles and equipment awaiting maintenance with actual or potential fluid leaks are confined to designated areas (delineated on the *Site Map*). Drip pans are placed under vehicles and equipment to collect leaking fluids.
   2) There are no provisions for the indoor storage of vehicles or equipment.

b) Fueling areas – Vehicles and equipment are fueled from a truck-mounted fuel tank; there are no bulk petroleum storage facilities on site. A spill response kit is available in the fluid storage shed.

c) Vehicle storage areas – Storage vessels of all materials (e.g., for used oil/oil filters, spent solvents, paint wastes, hydraulic fluids) are maintained in good condition, so as to prevent contamination of stormwater, and plainly labeled (e.g., "used oil," "spent solvents," etc.). Indoor storage is provided for fresh and waste fluids and filters.

d) Vehicle and equipment cleaning areas – A truck fleet is not maintained on the property; customers are responsible for cleaning their own trucks off site. Low sudsing, phosphate-free, biodegradable cleansers are used on mobile equipment during maintenance/repair operations within the Fueling and Maintenance Area. Runoff from cleaning operations is directed to the south retention basin. Note: the discharge of vehicle/equipment wash waters, including tank cleaning operations, are not authorized by this permit and must be covered under a separate SPDES permit or discharged to a sanitary sewer in accordance with applicable industrial pretreatment requirements.

e) Vehicle and equipment maintenance areas – The equipment maintenance area is shown on the *Stormwater Map*. Drip pans are used to contain leaks during repairs. All parts are drained of fluids prior to disposal. Only dry cleanup practices are used; wet clean up practices are prohibited where the practices would result in the discharge of pollutants to stormwater drainage systems. Incidental stormwater collected in the drip pans is collected along with the waste fluids for proper disposal.

d) Spill prevention and response procedures – The procedures and necessary spill response equipment are available to those employees who may cause or detect a spill or leak. Spill kits are available on site for use in response to a petroleum spill or leakage. See *Spill Prevention Plan* under separate cover.

e) Routine Inspections – Equipment is inspected regularly for leaks, worn hoses, or other defects that may result in the release of fluids. Stormwater management practices in the fueling, storage, and maintenance areas are inspected quarterly. All incoming vehicles upon arrival at the site will be visually inspected prior to discharge at the facility to verify that only authorized waste is contained within the load.

7.2 Structural Best Management Practices

a) Stormwater Retention System – All stormwater generated within each active phase the mine will be directed to the retention basin on site. The system is designed to contain all runoff from the 100-year, 24-hour storm event.

b) Stormwater Detention System –Stormwater from the access road will be discharged from the detention basin through Outfall #001 to an existing catch basin (see Appendix 13.6 for runoff calculations and Appendix 13.2 for maps).

c) Erosion and sediment control – Erosion and sediment control measures are discussed in Section 7.3. Sample Best Management Practices are contained in Appendix 13.5.

d) Leakage and spillage control – Drip pans and absorbent pads will be used during maintenance operations to prevent the accidental release of petroleum products to the environment (see *Spill Prevention Plan* under separate cover).

e) Diversions – Runon from upslope areas to the east will be diverted to un-mined or reclaimed vegetated portions of the property through the use of swales and berms (see stormwater maps in Appendix 13.2).

7.3 Erosion and Sediment Control Program

7.3.1 Program elements

The bases for the erosion and sediment control program at the site include:

a) Use of temporary control measures to prevent runoff from the affected areas. Silt fencing and use of topsoil stockpiles as temporary earth berms will be placed to control discharge of stormwater from the mining area.

b) A detention basin will be created to retain sediment and moderate stormwater flow.

c) Sequential reclamation will reduce potential erosion on land that is no longer to be affected by mining. Perimeter slopes and the mine floor will be reclaimed as mining progresses to limit the amount of unreclaimed land on the site. No more than 2 acres of land will be mined and unreclaimed at any one time (excluding the pond area.

7.3.2 Temporary Measures

The standards and specifications for erosion and sediment control measures are taken from the *New York Guidelines for Urban Erosion and Sediment Control*. Standards for stormwater control are taken from the *New York State Stormwater Management Design Manual.* See stormwater maps in Appendix 13.2 and *Sample Best Management Practices*, in Appendix 13.5 for the locations and specifications of the measures.

a) Silt Fencing – silt fencing will be placed along the mine limits in down-slope positions from the mine to control the movement of sediment from newly constructed berms and removed when the berms are stabilized with vegetation.

b) Perimeter Berms – topsoil and subsoil will be stockpiled in berms along the mine- and phase limits to control runoff. The berms will insure that there will be no discharge of turbid water or sediment-filled water and that the discharge of stormwater from any unreclaimed mined areas will be directed to the on-site detention basin before release outside of the life of mine boundary. The berms will be removed during reclamation.

c) Phased stripping – Topsoil will be stripped in preparation for mining. The stripping of soil will be limited to the area necessary for one season of mining in order to limit the acreage exposed to wind and water erosion.

d) Temporary Seeding – the stockpiled soil will be seeded with a fast-growing conservation seeding mixture (60 pounds per acre) and mulched with clean cereal straw (1 ton per acre) to provide a 100% coverage without bare spots within 30 days of construction to prevent erosion. A full vegetative cover will be maintained on the stockpiles until the soil is used in the final reclamation of the mine.
e) Diversions – swales will be created on the upslope side of the soil berms along the east side of the mine to divert stormwater runon away from the active mine area, Swales will also be created on the downslope edges of the non-active parts of the mine to divert clean water away from the detention basin. Stormwater will be discharged via stone aprons to un-affected or to reclaimed vegetated areas of the property. The diversions will be removed during reclamation.
f) Detention Basins – stormwater runoff from the entrance drive area will be directed to the detention basin prior entering the existing swale. Runoff from the 10-year and more frequent storms will be held for at least 24 hours to mitigate storm flows and trap sediment. See Appendix 13.2 for basin design and Appendix 13.6 for sizing calculations. The basins will remain following completion of mining.
g) Pavement cleaning – the paved portion of the access road (see below) will be cleaned as needed to prevent tracking of loose material onto the public highways.

7.3.3 Permanent Measures

a) Phased Reclamation – the existing mine area will be reclaimed sequentially, to minimize the amount of un-vegetated area; no more than 8 acres of land will be mined and unreclaimed at any one time.
b) Paved Access Road – the first 100 feet of the access drive from Black Meadow Road into the mine will be paved. This will reduce the tracking of loose material onto the public road.
c) Perimeter Bench Reclamation – the perimeter benches will be revegetated, as discussed in the *Mined Land Use Plan and Reclamation Plan Narrative* (under separate cover). The soil and vegetation will moderate runoff from the reclaimed benches.
d) Substrate Preparation – the final mine floor, benches, and any temporary haulageways to be reclaimed will be ripped, disked, plowed, or otherwise scarified to reduce soil compaction prior to placement of subsoil and topsoil. The mine floor and final benches will be loosened by under-drilling during the blasting process to create about 2-6 feet of in-place fragmented rock to provide drainage and rooting zone fractures. This will promote infiltration and reduce excessive stormwater runoff.
e) Soil Placement – soil will be uniformly spread on the area to be reclaimed to a depth of at least 6 inches. This will promote adequate root development and vegetation growth.
f) Revegetation – the perimeter slopes and floor will be revegetated upon achieving final reclamation grades. The seeding will take place during the periods of optimum conditions (April 15th – June 15th or August 15th – October 15th) to insure development of adequate vegetative cover. See the *Mined Land Use Plan and Reclamation Plan Narrative* (under separate cover) for more details.

7.4 Maintenance

All BMPs identified in this plan must be maintained in effective operating condition. If site inspections identify BMPs that are not operating effectively, maintenance must be performed before

the next anticipated storm event or as necessary to maintain the continued effectiveness of stormwater controls. If maintenance prior to the next anticipated storm event is impracticable, maintenance must be scheduled and accomplished as soon as practicable, but not more than 12 weeks after completion of the routine facility inspection or the comprehensive site evaluation, unless permission for a later date is granted in writing by the Department. In the case of nonstructural BMPs, the effectiveness of the BMP must be maintained by appropriate means (for example: spill response supplies available and personnel trained).

8.0 Non-Stormwater Discharges

8.1 Certification of Non-Stormwater Discharges

Any outfall created must be evaluated for the presence of non-stormwater discharges. The findings of the evaluation must be certified on Worksheet #5 (Appendix 13.3); the certification must be kept with this Plan. Complete Worksheet #6 if it is not possible to evaluate one or more specific outfalls for the presence of non-stormwater discharges; the completed worksheets should be kept with this Plan and made available to Departmental inspectors.

8.2 Allowable Non-Stormwater Discharges

8.2.1 Generally-authorized non-stormwater discharges

The following non-stormwater discharges are allowed under the Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity:

a) discharges from fire fighting;
b) fire hydrant flushings;
c) potable water sources including waterline flushings;
d) uncontaminated air conditioning or compressor condensate, and other uncontaminated condensate such as condensate from the surface of pressurized gas cylinders stored outside;
e) irrigation drainage;
f) landscape watering provided that all pesticides and fertilizers have been applied in accordance with manufacturer's instructions
g) routing external building washdown which does not use detergents;
h) pavement wash waters where detergents are not used and where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed);
i) uncontaminated ground water or spring water;
j) foundation or footing drains where flows are not contaminated with process materials such as solvents;
k) incidental windblown mist from cooling towers that collect on rooftops or adjacent portions of the facilities, but not intentional discharges from cooling towers.

8.2.2 Sector-specific authorized non-stormwater discharges

Sector J – The discharge of clean water applied to roadways for dust control may be authorized by this permit, provided that BMPs are in place to limit application rates thus minimizing surface runoff.

Sector P – no non-stormwater discharges are authorized under the General Permit.

9.0 Corrective Actions

9.1 Stormwater Discharges

When the visual examination indicates the presence of pollution or when the benchmark sample results indicate exceedances of the pollutants, the owner or operator must:

a) Inspect the facility for potential sources of *stormwater* contamination and/or causes of the exceedance to numeric limits;

b) Implement additional non-structural and/or structural BMPs to address any sources of contamination that are identified to prevent recurrence within the following timeframes:

- The implementation must be completed before the next anticipated storm event, if practicable, but not more than 12 weeks after discovery.
- If implementation will take longer than 12 weeks, the *owner or operator* must submit a proposed schedule for completion of the project and obtain a written approval from the Regional Water Engineer

c) Revise the facility's SWPPP in accordance with Part III.E; and,

d) Continue efforts to implement additional BMPs at the facility if corrective actions do not result in achieving *benchmark monitoring cut-off concentrations* and/or numeric effluent limitations.

9.2 Non-Stormwater Discharges

If a non-stormwater discharge is discovered the owner or operator must:

- Identify its source and determine whether it is an authorized discharge.
- Upon determination that the discharge is not covered under this permit or another SPDES permit, the owner or operator shall notify the Region 3 Water Engineer, of the unauthorized discharge and begin immediate actions to eliminate the discharge. These actions must be documented in the SWPPP.

10.0 Facility Inspections

10.1 Routine Inspections

In addition to or as part of the comprehensive site inspection, a qualified person (trained in accordance with Section 7.1.1(f) above) must perform routine inspections quarterly which include all BMPs at the facility for evidence of actual or potential discharges of contaminated stormwater and shall include all areas of the facility where industrial materials or activities are exposed to stormwater such as the following areas:

a) chemical handling and storage areas;
b) vehicle & equipment maintenance areas;
c) fueling areas; and
d) other potential sources of pollution.

The inspection shall:

(a) Evaluate conditions and maintenance needs of stormwater management devices (e.g., cleaning oil/water separators, catch basins) to avoid situations that may result in the practice becoming a source of pollutants.

(b) Detect leaks and ensure the good condition of drums, tanks and containers

(c) Evaluate the performance of the existing stormwater BMPs described in this Plan.

Any deficiencies in the implementation and/or adequacy of the SWPPP must be documented. Deficiencies must be addressed, corrected, monitored and recorded in accordance with Section 12.0, below. The routine inspection shall be documented and shall be kept with the SWPPP.

10.2 Annual Comprehensive Site Compliance Evaluation

10.2.1 Scope of Compliance Inspection and Evaluation

A comprehensive site compliance inspection at least once per year by a qualified person who may be either a facility employee or outside consultant hired by the facility. The inspector must be familiar with the industrial activity, the BMPs, the SWPPP, and must possess the skills to assess conditions at the facility that could impact stormwater quality and assess the effectiveness of the BMPs that have been chosen to control the quality of the stormwater discharges.

Inspections must include all areas where industrial materials or activities are exposed to stormwater, as identified in Section 4.0, and areas where unauthorized discharges spills and leaks have occurred within the past three years. At a minimum the inspection shall identify or include:

h) Industrial materials, residue or trash on the ground that could contaminate or be washed away in stormwater;
ii) Leaks or spills from industrial equipment, drums, barrels, tanks or similar containers;
iii) Examination of all outfall locations, to determine the presence of unauthorized non-stormwater discharges or authorized non-stormwater discharges that are not certified in accordance with Section 8.0;
iv) Off-site tracking of industrial materials or sediment where vehicles enter or exit the site;
v) Tracking of material away from the area where it originates including from areas of no exposure to exposed areas;
vi) Evidence of, or the potential for, pollutants entering or discharging from the drainage system;
vii) Inspection of areas found to be the source of pollutants observed during visual and analytical monitoring done during the year;
viii) Stormwater BMPs identified in the SWPPP must be observed to ensure that they are operating correctly.

If the Comprehensive Site Compliance Inspection indicates the presence of stormwater pollution (e.g., color, odor, floating solids, settled solids, suspended solids, foam, oil sheen, or other indicators), the owner or operator must, implement corrective actions in Section 9.0.

10.2.2 Compliance Inspection and Evaluation Report

A compliance inspection & evaluation report must be made and retained as part of the SWPPP for a period of at least five (5) years from the date of the report. At a minimum, the report must include:

1 The scope of the inspection,
2. The name(s) of personnel making the inspection,
3. The date(s) of the inspection,
4. Major observations relating to the implementation of the SWPPP, including:
   (i) the location(s) of discharges of pollutants from the site;
   (ii) the location(s) of previously unidentified discharges of pollutants from the site;
   (iii) location(s) of BMPs that need to be maintained;

(iv) location(s) of BMPs that failed to operate as designed or proved inadequate for a particular location;
(v) location(s) where additional BMPs are needed that did not exist at the time of inspection;
(vi) any incidents of noncompliance; and,
(vii) summary of results of sample analysis

5. Required corrective actions must be recorded and retained with the SWPPP.
6. Where a report does not identify any incidents of noncompliance, the report shall contain a certification that the facility is in compliance with the SWPPP and this permit.
7. The report shall be signed in accordance with Section 11.1 below and kept with the SWPPP.

10.2.3 Credit as a Routine Facility Inspection

Where compliance inspection schedules overlap with routine inspections required above, the annual compliance inspection may be used as one of the routine inspections.

10.3 Follow-up Actions

If site inspections identify stormwater pollution or BMPs that are not operating effectively, the conditions must be corrected before the next anticipated storm event or as necessary to maintain the continued effectiveness of stormwater controls. If correction of conditions prior to the next anticipated storm event is impracticable, it must be scheduled and accomplished as soon as practicable, but not more than 12 weeks after completion of the routine facility inspection or, the comprehensive site evaluation, unless permission for a later date is granted in writing by the Department. In the case of nonstructural BMPs, the effectiveness of the BMP must be maintained by appropriate means (for example: spill response supplies available and personnel trained).

11.0 Signature and Plan Review

A) The Plan and all required reports shall be signed by and retained on-site at the facility.
B) All Notice of Intent (NOI), Notice of Modification (NOM) and Notice of Termination (NOT) forms, SWPPPs, reports, certifications or information submitted to the Department or records that are required to be maintained at the facility shall be signed as follows:

1) Corporate Officer – All Notice of Intent (NOI), Notice of Modification (NOM) and Notice of Termination (NOT) forms shall be signed by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:
i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or
a) the manager of one or more manufacturing, production or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements, and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

2) Duly Authorized Representatives – All reports required by the permit and other information requested by the Department shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:
   a. The authorization is made in writing by a person described above and submitted to the Department.
   b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of manager, owner or operator, superintendent, or position of equivalent responsibility or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position).
3) Changes to authorization – If an authorization under Part VI.H.1. is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, letter notification satisfying the requirements above must be submitted to the Department prior to or together with any reports, information, or applications to be signed by an authorized representative.
4) Certification – Any person signing documents under this section shall make the following certification: "I certify under penalty of law 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 am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations".
5) Penalties for Falsification of Reports – In accordance with 6 NYCRR Part 750-2.4(f) any person who knowingly makes any false material statement, representation, or certification in any application, record, report or other document filed or required to be maintained under this permit, including reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than $37,500, or by imprisonment for not more than 2 years, or by both.
6) Penalties for Falsification of Monitoring Systems – In accordance with 6 NYCRR Part 750-2.5(a)(6) any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by fines and imprisonment.

C) A copy of the Multi-Sector General Permit must be kept on file at the facility, along with a copy of this SWPPP. The Plan must be available to the NYSDEC for review at the time of an on-site inspection and to representatives of the Town of Chester municipal storm sewer authorities upon request. A copy of the Plan must be made available to the public upon written request.

11.2 Required Modifications

The NYSDEC may notify the permittee at any time that the Plan does not meet one or more of the minimum requirements of the Permit. The notification shall identify those provisions of the Permit that are not being met, as well as the required modifications. The required changes to the Plan shall be made within 30 days of receipt of such notification, unless permission for a later date is granted in writing by the NYSDEC, and shall submit a written certification to the NYSDEC that the requested

changes have been made.

12.0 Keeping SWPPP Current

12.1 Amendments

The Plan shall be amended whenever:

1. There is a change in design, construction operation, or maintenance at the facility which may have an effect on the potential for the discharge of pollutants from the facility which has not otherwise been addressed in the Plan; or
2. During inspections, monitoring, or investigations by facility personnel or by local, State, or federal officials it is determined that the Plan is ineffective in eliminating or significantly minimizing pollutants from sources identified under this Plan or otherwise not achieving the general objectives of controlling pollutants in discharges from this facility.
3. As required by the NYS Department of Environmental Conservation.

12.2 New Stormwater Discharges

4. New stormwater discharges associated with industrial activity which require any other Uniform Procedures Act permits cannot be covered under this permit until the other required permits are obtained. Upon satisfying the State Environmental Quality Review Act (SEQRA) requirements and obtaining the necessary permits, the applicant may submit a NOI to obtain coverage under this general permit. In order to facilitate the Department's review of a multi-permitted project, an applicant must submit a report including the information specified in Appendix E with the NOI. A copy of this report must be retained with the SWPPP.

13.0 Appendix

13.1 Completed Reporting Forms
13.2 Figures
13.3 Forms and Work Sheets
13.4 Monitoring Requirements
13.5 Sample Best Management Practices
13.6 Runoff Analyses

Appendix 13.1 Completed Reporting Forms

Annual Certification Reports w/ Discharge Monitoring Reports

Annual Dry Weather Flow Forms

Quarterly Visual Monitoring Forms

Annual Compliance Evaluation Reports

6052362228

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Notice of Intent

GP-0-17-004

This is the Notice of Intent for Stormwater Discharges Associated with Industrial Activity under the State Pollutant Discharge Elimination System (SPDES) Multi-Sector General Permit GP-0-17-004.

The completed Notice of Intent (NOI) should be submitted to:
MSGP Coordinator,
NYSDEC Division of Water,
625 Broadway, 4th Floor
Albany, New York 12233-3505

For Department Use Only

NYR [ ][ ][ ][ ][ ]

Save time by filing your NOI electronically using the E-NOI found on the Departments website

IMPORTANT

- **Applicants must read and understand the conditions of the permit prior to submitting this NOI Form.**
- **Applicants are responsible for identifying and obtaining other DEC permits that may be required.**
- **Use this NOI to obtain coverage under GP-0-17-004 OR to make revisions to a previously submitted NOI.**
- **All sections must be completed unless otherwise noted. Incomplete forms will be returned to you, thereby delaying your coverage under this General Permit.**
- **Type or print in boxes. Avoid contact with the edge of the boxes.**
- **Fill in circles completely and do not use check marks.**
- **The Owner/Operator must sign the NOI.**

SECTION 1

Owner/Operator Information

Federal Tax ID #

20-2733477

Enter the name of the legally responsible entity and the address of the executive office.

O/O Name

Chester Hill Holding Company, Inc.

O/O Street Address

PO Box 1351, 28 Golden Ave.

O/O City

Greenwood Lake

O/O State: NY

O/O Zip: 10925-

Contact Information

Enter the name and contact information for the individual responsible for communicating with DEC regarding the implementation of the MSGP on behalf of the owner/operator.

Contact First Name: Frank

Contact Last Name: Lotito

Contact Phone: 845-222-6556

Contact eMail

Facility Information

Enter the complete street address of the physical location of the facility.

Facility Name

Chester Hill Holding Company Inc.

Facility Street Address

87 Black Meadow Road

Facility City

Chester

State: NY

Facility Zip: 10918 -

Facility County

Orange

Provide the geographic coordinates in decimal degrees for the latitude & longitude of the facility. The NYSDEC Stormwater Interactive Map on the DEC's website can be used to get coordinates.
Go to: www.dec.ny.gov/imsmaps/stormwater/viewer.htm

41.339694 (Latitude) -74.283296 (Longitude)

Billing Information

☒ Billing information is same as Owner/Operator (Do not complete this section)

○ Billing information is different from Owner/Operator (Please complete billing information below)

Name

Street Address

City

State

Zip -

SECTION 2

1. Does your facility meet all the eligibility requirements listed in Part I.B of the SPDES Multi-Sector General Permit to gain coverage under this general permit? ..... ⊗ Yes ○ No

If No, contact the Department to discuss next steps. If Yes, go to question 2(a).

2(a). Has a Stormwater Pollution Prevention Plan (SWPPP) been prepared for this facility in accordance with the requirements of the SPDES Multi-Sector General Permit GP-0-17-004? If No, you are not eligible for permit coverage. ..... ⊗ Yes ○ No

2(b). How will you make your SWPPP available to the public?

○ Posting a copy online (Provide URL).

○ Maintain copy at the facility address listed in the facility information section of the NOI.

⊗ Maintain copy at the following location (Provide address):

Street Address: 28 Golden Ave.

City: Greenwood Lake | State: NY | Zip: 10925 -

3. Does your facility conduct any activities listed in Part I.C of the SPDES Multi-Sector General Permit which would make your facility ineligible for coverage under this general permit? ..... ○ Yes ⊗ No

If Yes, contact the Department to discuss next steps. If No, go to question 4.

4. Provide the name of the nearest surface waterbody into which site runoff will discharge. If more than one, list all that apply:

Black Meadow Creek tributary to Otter Kill Creek

5(a). Has the surface waterbody in question 4 been identified as an impaired waterbody as defined in MSGP 0-17-004? If No, go to question 6(a). ..... ○ Yes ⊗ No

To determine if the waterbody in Question 4 is impaired use the following links available on the Department's public web site:

MSGP Toolbox with Map of Impaired Waterbodies http://www.dec.ny.gov/chemical/62803.html
Impaired Waters Listings ..... http://www.dec.ny.gov/chemical/31290.html.

5(b). Is the pollutant(s) causing the impairment a pollutant of concern included in the benchmarks and/or effluent limitations to which the facility is subject to in Part VII of the SPDES Multi-Sector General Permit? A list of applicable pollutant(s) of concern for the SPDES Multi-Sector General Permit can be found in Appendix G of the permit. If No, go to question 6(a). ..... ○ Yes ○ No

5(c). Does your SWPPP include measures to address the pollutant(s) of concern as required by Part III.D.2 of the SPDES Multi-Sector General Permit? If No, contact the Department to discuss next steps. .. ○ Yes ○ No

6(a). Does site runoff enter a Municipal Separate Storm Sewer System (MS4) including roadside drains, swales, ditches, culverts, etc.? If No, go to question 7(a). ..... ⊗ Yes ○ No

6(b). If Yes, enter the name of the municipality/entity that owns the Municipal Separate Storm Sewer System

Town of Chester

7(a). Has this facility been assigned a SPDES MSGP ID under previous versions of the MSGP? ..... ○ Yes ⊗ No
If No, go to question 8.

7(b). If Yes, Provide the ID if known (Note: All SPDES MSGP IDs begin with NYR00)

The facility's existing ID is: | N | Y | R | 0 | 0 | | | | |

SECTION 3

8. Does this facility have coal piles that are exposed to precipitation? ..... ○ Yes ⊗ No

9. Does this facility have salt piles that are exposed to precipitation? ..... ○ Yes ⊗ No

10. Does this facility discharge stormwater from secondary containment areas for liquid bulk storage or transfer areas? ..... ○ Yes ⊗ No

11. SECTOR S - Is this facility an airport that uses more than 100,000 gallons of glycol-based deicing/anti-icing chemicals and/or 100 tons or more of urea on an average annual basis? ..... ○ Yes ⊗ No

12. Is a Representative Outfall Waiver being claimed in accordance with Part IV.G?
(If Yes, please submit the Representative Outfall waiver form with the NOI). ..... ○ Yes ⊗ No

13. For each stormwater discharge associated with industrial activity at your facility identify the outfall number (e.g., 001, 002, etc.); the four digit Standard Industrial Classification (SIC) codes, the Sector Code, the Sector N Subsector, or 2-letter Industrial Activity Codes that best represent the principal products or services rendered by the facility for that drainage area; and the Benchmark (B) and/or Compliance (C) monitoring required; and the acreage of industrial activity exposed to stormwater for each outfall (round to nearest tenth of an acre):

Industrial Activities (SIC or 2-letter Codes)

Outfall Number	Primary SIC	Sector	Monitoring Required	Secondary SIC	Sector	Monitoring Required	Tertiary SIC	Sector	Monitoring Required	Acreage
001	1422	J	B	4212	P	B				10.4

Total Acreage 10.4

7055362222

14. Is the facility subject to any of the following EPA Point Source Category Effluent Limitations?

(a) SECTOR A - Discharges resulting from spraydown or intentional wetting of logs at wet deck storage areas? ..... ○ Yes ⊗ No

If Yes, list Outfall numbers.

(b) SECTOR C - Contaminated runoff from phosphate fertilizer manufacturing facilities? ..... ○ Yes ⊗ No

If Yes, list Outfall numbers.

(c) SECTOR D - Runoff from asphalt emulsion facilities? ..... ○ Yes ⊗ No

If Yes, list Outfall numbers.

(d) SECTOR E - Runoff from material storage piles at cement manufacturing facilities? ..... ○ Yes ⊗ No

If Yes, list Outfall numbers.

(e) SECTOR J - Mine dewatering discharges at crushed stone, construction sand and gravel, and industrial sand mines? ..... ○ Yes ⊗ No

If Yes, list Outfall numbers.

(f) SECTOR L - Runoff from landfills? ..... ○ Yes ⊗ No

If Yes, list Outfall numbers.

(g) SECTOR O - Coal Pile runoff at steam electric power generating facilities? ..... ○ Yes ⊗ No

If Yes, list Outfall numbers.

(h) SECTOR S - Discharges from airport deicing using airfield deicing products that contain urea at an airport with at least 1,000 annual non-propeller aircraft departures.? ..... ○ Yes ⊗ No

If Yes, list Outfall numbers.

Certification

I certify under penalty of law 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 am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Frank
O/O First Name (please print or type)

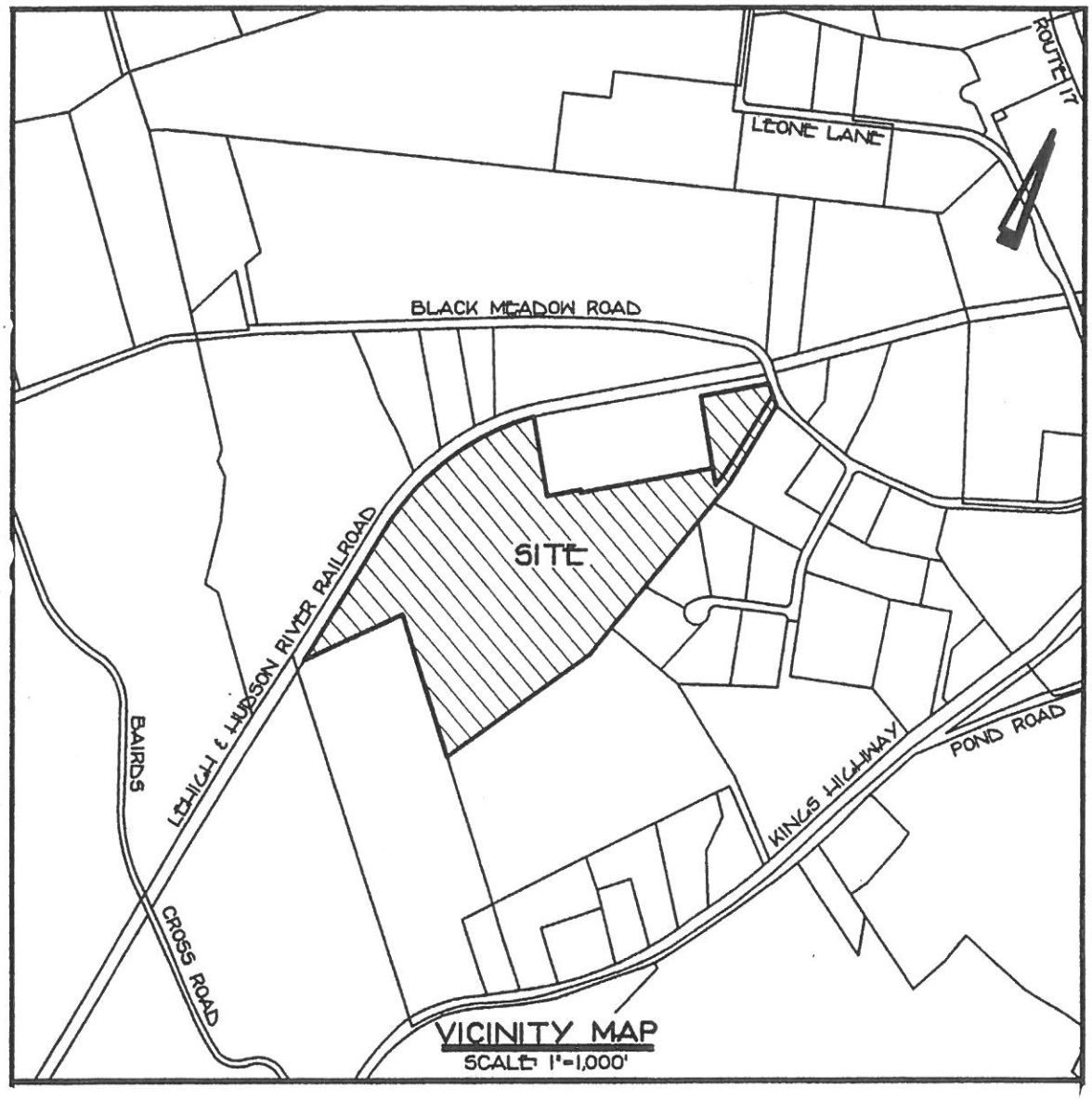
MI

06/29/2016
Date

Lotito
O/O Last Name (please print or type)

O/O Signature

Appendix 13.2 Figures



VICINITY MAP

SCALE: 1"=1,000'


(Joins sheet 61)
Chester
East Chester
Durland Hill
CONRAIL
RSP
OVE
OTC
(Joins sheet 72)
(Joins sheet 80)
N
1 Mile
5 000 Feet
Scale 1:15 840
1 000
2 000
3 000
4 000
5 000
485 000 FEET
915 000 FEET

Appendix 13.3 Forms & Work Sheets

Appendix 13.3 Forms & Work Sheets

STORMWATER POLLUTION PREVENTION PLAN
ANNUAL DRY WEATHER FLOW MONITORING
Chester Hill Holding Mine
Black Meadow Road
Town of Chester, Orange County, New York

Year: _____

Name of Person(s) completing evaluation: _____

Date of evaluation: __/__/__

Weather conditions during inspection: _____

Number of days since last precipitation (must be more than 3 days): _____

Evaluation:

Outfall Number: ___

- Is there any discharge at the outfall? YES / NO

  If you circled yes, description and source of discharge identified (stormwater or non-stormwater?):

_____

_____

_____

- Is discharge allowable under SPDES Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity? YES / NO

  If you circled YES, what actions or modifications to the SWPPP are needed to address newly identified discharges?

_____

_____

_____

  If you circled NO, what actions are needed to bring facility into compliance?

_____

_____

_____

- What other changes to the SWPPP are needed to ensure that the site is in compliance?

_____

_____

_____

Certification of Compliance

This Annual Dry Weather Flow Monitoring inspection has been conducted by qualified personnel who properly gathered and evaluated information submitted for this report. The information in this report, to the best of my knowledge, is accurate and complete.

Name (print):_____ Title: _____

Signature: _____ Date: _____

STORMWATER POLLUTION PREVENTION PLAN
ANNUAL COMPLIANCE EVALUATION REPORT

Chester Hill Holding Mine
Black Meadow Road
Town of Chester, Orange County, New York

Year: _____

Name of Person(s) completing evaluation: _____
Date of evaluation: __/__/__
Weather conditions during inspection: _____
Areas inspected during evaluation:
Inspect all exposed areas of the facility for evidence of contamination of runoff. Areas that need to be inspected include all areas where spills have or are likely to occur, all structural and non structural BMP's, the stormwater collection system, and all discharge points from the facility.

The inspections must include all areas where industrial materials or activities are exposed to stormwater and areas where spills and leaks have occurred with the past three years. Inspections should look for but not limited to:

g) Industrial materials, residue, or trash on the ground that could contaminate or be washed away in stormwater;
h) Leaks or spills from industrial equipment, drums, barrels, tanks, or similar containers;
i) Unauthorized non-stormwater discharges or allowable non-stormwater discharges that are not certified;
j) Off-site tracking of industrial materials or sediment where vehicles enter or exit the site;
k) Tracking or blowing of raw, final, or waste materials from areas of no exposure to exposed areas; and
l) Evidence of, or the potential for, pollutants entering the drainage system. All BMPs should be inspected to ensure that they are operating properly.

The following potential source areas of storm water contamination (identified in Section 4.2 of the SWPPP) were evaluated:

a) Excavation, processing, and reclamation areas
b) Truck and equipment operating areas

The following structural and non structural Best Management Practices (as described in the SWPPP) were evaluated:

a) Sediment and erosion controls
b) Management of runoff
c) Secondary Containment
d) Stormwater collection system
e) Outfall discharge

Evaluation:
• Are there any new sources of potential stormwater pollutants not previously identified in the SWPPP? YES / NO

If you circled yes, how will the SWPPP be modified to prevent these sources from contaminating runoff?

_____
_____
_____

- Have either visual inspections or monitoring during the past year indicated pollution of stormwater which have not yet been addressed? YES / NO

If you circled yes, describe the potential sources of any pollutants found in runoff:

_____
_____
_____

What actions or modifications to the SWPPP are needed to prevent these pollutants from reaching the receiving waters?

_____
_____
_____
_____
_____
_____
_____
_____

Describe any other places where the site inspection indicates noncompliance with the SWPPP and the conditions of the general permit

_____
_____
_____

- What other changes to the SWPPP are needed to ensure that the site is in compliance?

_____
_____
_____
_____
_____
_____

Certification of Compliance

This Annual Compliance Evaluation Report has been prepared by qualified personnel who properly gathered and evaluated information submitted for this Report. The information in this Report, to the best of my knowledge, is accurate and complete. After inspection of all exposed industrial areas, BMPs, and stormwater systems, and review of the SWPPP and required monitoring I find that this facility is in compliance with the SWPPP and the permit.

Name (print):_____ Title: _____

Signature: _____ Date: _____

STORMWATER POLLUTION PREVENTION
ANNUAL COMPLIANCE EVALUATION
Chester Hill Holding Mine
Annual Inspection Record

Date of Audit: __/__/__
Inspector: _____
Page: __ of __ (attach additional pages if needed)

INSTRUCTIONS: Review each item. Check if each item is satisfied. If a problem or concern exists, describe and report to the Person-in-Charge for follow up action.	OK	Needs Improvement (describe)	Follow Up Action: By:_____
RECORDS UP TO DATE?			
EXCAVATION AREA			
GENERAL HOUSEKEEPING (trash, residue, off-site tracking)			
MATERIAL PROCESSING AREAS			
STORMWATER CONTROLS (BMP'S)			
EQUIPMENT CONDITION (leaks, drips)			
NON-STORMWATER DISCHARGES?			
OUTFALL CONDITION			
EVIDENCE OF SPILLS?			

Comments:

_____
_____
_____
_____
_____
_____
_____

Signature of Inspector: _____

STORMWATER POLLUTION PREVENTION PLAN
DRY-WEATHER COMPLIANCE EVALUATION REPORT
CHESTER HILL HOLDING MINE
Black Meadow Road
Town of Chester, NY 12501

Report for: _____ (year)

Name of Person(s) completing evaluation: _____
Date of evaluation: __/__/__
Days since last rainfall: _____

Instructions:

- Conduct at least one dry weather flow inspection each year after at least three (3) consecutive days of no precipitation to determine the presence of non-stormwater discharges to the stormwater drainage system.
- If a non-stormwater discharge is discovered, identify the source of flow observed during the inspection to determine whether it is an authorized discharge.
- Notify the Department within 14 days of any non-authorized discharge that cannot be easily eliminated.
- Results of the dry weather flow inspections must be documented and retained on-site with the Stormwater Pollution Prevention Plan (SWPPP).

Outfall #	Method used to evaluate discharge	Non-stormwater discharge?	Potential source of non-stormwater	Actions taken
		YES / NO		
		YES / NO		

Certification of Compliance

This Dry-Weather Compliance Evaluation Report has been prepared by qualified personnel who properly gathered and evaluated information submitted for this Report. The information in this Report, to the best of my knowledge, is accurate and complete.
Name (print):_____ Title: _____
Signature: _____ Date: _____

Employee training

Instructions:

- Keep records of employee training, including the date of the training or in-person training, consider using the tables below to document your employee trainings. For computer-based or other types of training, keep similar records on who was trained and the type of training conducted.

Training Date:	
Training Description:	
Trainer(s):	
Employee(s) trained	**Employee signature**

Training Date:	
Training Description:	
Trainer(s):	
Employee(s) trained	**Employee signature**

Training Date:	
Training Description:	
Trainer(s):	
Employee(s) trained	**Employee signature**

MSGP Quarterly Visual Assessment Form

(Complete a separate form for each outfall you assess)

Name of Facility: SPDES Tracking No.

Outfall Name: 001 "Substantially Identical Outfall"? ☐ No ☐ Yes ☐ N/A

Person(s)/Title(s) collecting sample:

Person(s)/Title(s) examining sample:

Date & Time Discharge Began: Date & Time Sample Collected: Date & Time Sample Examined:

Substitute Sample? ☐ No ☐ Yes

Nature of Discharge: ☐ Rainfall ☐ Snowmelt

If rainfall: Rainfall Amount:_ _inches Previous Storm Ended > 72 hours Before Start of This Storm? ☐ Yes ☐ No* (explain):

Parameter

Color ☐ None ☐ Other (describe):

Odor ☐ None ☐ Musty ☐ Sewage ☐ Sulfur ☐ Sour ☐ Petroleum/Gas _____
☐ Solvents ☐ Other (describe):

Clarity ☐ Clear ☐ Slightly Cloudy ☐ Cloudy ☐ Opaque ☐ Other

Floating Solids ☐ No ☐ Yes (describe):

Settled Solids** ☐ No ☐ Yes (describe):

Suspended Solids ☐ No ☐ Yes (describe):

Foam (gently shake sample) ☐ No ☐ Yes (describe):

Oil Sheen ☐ None ☐ Flecks ☐ Globs ☐ Sheen ☐ Slick
☐ Other (describe):

Other Obvious Indicators of Stormwater Pollution ☐ No ☐ Yes (describe):

* *The 72-hour interval can be waived when the previous storm did not yield a measurable discharge or if you are able to document (attach applicable docume* that less than a 72-hour interval is representative of local storm events during the sampling period.

** Observe for settled solids after allowing the sample to sit for approximately one-half hour.

Detail any concerns, additional comments, descriptions of pictures taken, and any corrective actions taken below (attach additiona sheets as necessary).

Certification by Facility Responsible Official (Refer to MSGP Subpart 11 Appendix B for Signatory Requirements)

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A. Name: B. Title:

C. Signature: D. Date Signed:

Maintenance

Instructions:

- Include in your records documentation of maintenance and repairs of control measures and industrial equipment, including:
  - the control measure/equipment maintained,
  - date(s) of regular maintenance,
  - date(s) of discovery of areas in need of repair/replacement, and for repairs,
  - date(s) that the control measure/equipment was returned to full function, and
  - the justification for any extended maintenance/repair schedules (see Part 2.1.2.3 of the 2008 MSGP).

- Provide information, as shown below, to document your maintenance activities for each control measure and industrial equipment. Repeat as necessary by copying and pasting the information below for additional control measures.

Control Measure Maintenance Records (copy information below for each control measure)

Control Measure:
Regular Maintenance Activities:
Regular Maintenance Schedule:

Date of Action:
Reason for Action: ☐ **Regular Maintenance** ☐ **Discovery of Problem**
If Problem,
- **Description of Action Required:**
- **Date Control Measure Returned to Full Function:**
- **Justification for Extended Schedule, if applicable:**

Notes:

LIST OF SIGNIFICANT SPILLS AND LEAKS

Worksheet #4
Completed by: _____
Title: _____
Date: _____

Directions: Record below all significant spills and significant leaks of toxic or hazardous pollutants that have occurred at the facility in the three years prior to the effective date of the permit.

Definitions: Significant spills include, but are not limited to, releases of oil or hazardous substances in excess of reportable quantities.

1st Year Prior

Date (month/day/year)	Spill	Leak	Location (as indicated on site map)	Description				Response Procedure		Preventive Measures Taken
				Type of Material	Quantity	Source, If Known	Reason	Amount of Material Recovered	Material No Longer Exposed to Storm Water (True/False)	

2nd Year Prior

Date (month/day/year)	Spill	Leak	Location (as indicated on site map)	Description				Response Procedure		Preventive Measures Taken
				Type of Material	Quantity	Source, If Known	Reason	Amount of Material Recovered	Material No Longer Exposed to Storm Water (True/False)	

3rd Year Prior

Date (month/day/year)	Spill	Leak	Location (as indicated on site map)	Description				Response Procedure		Preventive Measures Taken
				Type of Material	Quantity	Source, If Known	Reason	Amount of Material Recovered	Material No Longer Exposed to Storm Water (True/False)	

9702489784

Annual Certification Report
SPDES Multi-Sector General Permit for Stormwater
Discharges Associated with Industrial Activity (GP-0-11-009)

The permittee shall complete this Annual Certification Report form by answering the following questions, describing improvements to the facility's Stormwater Pollution Prevention Plan (SWPPP), provide copies of monitoring results on appropriate Monitoring Reports Forms and signing the certification at the end of this form. This completed report is to be submitted each calendar year by March 31st of the following year to: Industrial Stormwater General Permit Coordinator, NYSDEC, Bureau of Water Permits, 625 Broadway, Albany, NY, 12233-3505

SECTION I: FACILITY INFORMATION

Permit I.D. No.: NYR00 ☐☐☐☐ **Report for Calendar Year:** _____

Owner Name

Facility Name

SECTION II: GENERAL INFORMATION:

1. List the number of stormwater outfalls at the facility that are from areas of industrial activity. ..... ☐☐☐

2. Is the facility claiming any monitoring waivers? ..... ○ Yes ○ No
[describe and certify in your cover letter]
   - ○ Representative Outfall
   - ○ Inactive or Unstaffed Site
   - ○ Adverse Climatic Conditions
   - ○ Alternate Certification of "Not Present" or "No Exposure"

3. Is the information provided in your original Notice of Intent or Termination (NOIT) submission still accurate and up to date? If not, please submit an updated NOIT indicating the correct facility information. ..... ○ Yes ○ No

4. Has a comprehensive site compliance evaluation been conducted at the facility in the past year? ..... ○ Yes ○ No

5. Is the facility's Stormwater Pollution Prevention Plan (SWPPP) kept up to date and modified when necessary? ..... ○ Yes ○ No

SECTION III: QUARTERLY VISUAL EXAMINATIONS AND DRY WEATHER FLOW INSPECTIONS:

6. Have the required quarterly visual examinations of stormwater at the facility been performed during this reporting period? ..... ○ Yes ○ No

7. Did any of the quarterly visual examinations result in observations of color, odor, clarity, floating solids, settled solids, suspended solids, foam, oil sheen, or other indicators of stormwater pollution and contamination? ..... ○ Yes ○ No

8. Was the annual dry weather flow inspection performed during this reporting period? ..... ○ Yes ○ No

9. Were any indicators of stormwater pollution or unauthorized discharges identified? ..... ○ Yes ○ No

10. Did any of these findings result in modification of the SWPPP? ..... ○ Yes ○ No ○ NA

7835489789

SECTION IV: STORMWATER MONITORING - BENCHMARK PARAMETERS:

11. Is the permittee required to monitor stormwater at the facility for benchmark parameters? (If no, skip to Section V) ..... ○ Yes ○ No

12. Were there any of the sampling results from this year higher than the cut-off values listed in the permit? ..... ○ Yes ○ No

13. Were there any monitoring problems? (Answer "Yes" if storm event criteria was not *met or if the laboratory indicated quality assurance/quality control problems)* ..... ○ Yes ○ No

14. If any of the sampling results were higher than the benchmark values listed in the permit, was the facility inspected to identify the source? ..... ○ Yes ○ No ○ NA

15. Did this result in modification of the SWPPP? ..... ○ Yes ○ No ○ NA

SECTION V: STORMWATER MONITORING - COMPLIANCE MONITORING

16. Is the permittee required to conduct compliance monitoring for storm water discharges subject to Point Source Category Effluent Limitation? ..... ○ Yes ○ No

17. Is the permittee required to conduct compliance monitoring for storm water discharges from coal piles? (If no to questions 16 & 17, go to Section VI) ..... ○ Yes ○ No

18. Were there any monitoring problems? (Answer "Yes" if storm event criteria was not met or if the laboratory indicated quality assurance/quality control problems) ..... ○ Yes ○ No

19. Were any of the sampling results from this year higher than the effluent limitation listed in the permit? ..... ○ Yes ○ No

20. If any of the sampling results were higher than the effluent limitations listed in the permit, was the facility inspected to identify the source? ..... ○ Yes ○ No ○ NA

21. Did this result in modification of the SWPPP? ..... ○ Yes ○ No ○ NA

SECTION VI: SUMMARY

Provide a brief description of any facility changes; problems identified during comprehensive compliance evaluations, quarterly visual observations or monitoring results; and action taken to improve the quality of the stormwater discharge.

CERTIFICATION

I certify under penalty of law 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 am aware that there are significant penalties for submitting false information, including the *possibility of fine and imprisonment for knowing violations.*

Owner/Operator First Name (please print or type) | MI | Date

Owner/Operator Last Name (please print or type) | Owner/Operator Signature

Appendix 13.4 Monitoring Requirements

Quarterly Visual Monitoring

a) The permittee must perform and document a quarterly visual examination of a stormwater discharge from each outfall. The examination must be made at least once every quarter. No analytical tests are required to be performed on the samples for the purpose of meeting the visual monitoring requirements. The examination must document observations of color, odor, clarity, floating solids, settled solids, suspended solids, foam, oil sheen, and any other obvious indicators of stormwater pollution. The visual examination must be made during daylight hours. The examination must be conducted in a well-lit area. Where practicable, the same individual should carry out the collection and examination of discharges for the entire permit term for consistency.

b) Visual examinations must be made of samples collected within the first 30 minutes (or as soon thereafter as practical, but not to exceed one hour) of when the runoff or snowmelt begins discharging from the facility. All samples (except snowmelt samples) must be collected from the discharge resulting from a storm event that is greater than 0.1 inches in magnitude and that occurs at least 72 hours from the previously measurable (greater than 0.1 inch rainfall) storm event. The 72-hour storm interval is waived if the preceding measurable storm did not result in a stormwater discharge (for example: storm events in excess of 0.1 inches may not result in a stormwater discharge at some facilities). If no qualifying storm event resulted in runoff from the facility during a monitoring quarter, the permittee is excused from visual monitoring for that quarter provided that documentation is included with the monitoring records indicating that no qualifying storm event occurred that resulted in stormwater runoff during that quarter. If a visual examination was performed and the storm event was later determined not to be a measurable (greater than 0.1 inch rainfall) storm event, the visual examination should be included in the SWPPP records. All documentation must be signed and certified. A Quarterly Visual Monitoring Form has been included in Appendix 13.3.

c) If the visual examination indicates the presence of stormwater pollution (for example: color, odor, floating solids, settled solids, suspended solids, foam, oil sheen, or other indicators), the permittee must evaluate the facility for potential sources of stormwater contamination. Any sources of contamination that are identified must be remedied. Such remedies may include implementation of non-structural or structural BMPs to prevent recurrence. The facility's SWPPP must be updated to reflect these revisions within 14 days of the inspection for items that can be readily resolved. More complicated maintenance or repairs shall be performed in accordance with the timeframes for more complicated maintenance and repairs described under Section 7.4 *Implementation Schedule, Maintenance, and Inspections* or Section 10.2 *Follow-up Actions*.

d) The visual examination must be documented and maintained on-site with the Stormwater Pollution Prevention Plan (SWPPP). The report must include the outfall location, the examination date and time, examination personnel, the nature of the discharge (i.e., runoff or snow melt), visual quality of the stormwater discharge (including observations of color, odor, clarity, floating solids, settled solids, suspended solids, foam, oil sheen, and other obvious indicators of stormwater pollution), probable sources of any observed stormwater contamination and actions taken to eliminate these sources.

Annual Dry Weather Flow Monitoring

a) The permittee must perform and document at least one dry weather flow inspection each year after at least three (3) consecutive days of no precipitation. The dry weather flow inspection shall be conducted to determine the presence of non-stormwater discharges to the stormwater drainage system.

b) If a non-stormwater discharge is discovered, the Permittee shall identify its source to determine whether it is an authorized discharge (for example: a discharge covered by another SPDES permit or an authorized non-stormwater discharge. The Permittee shall modify the SWPPP to address any newly identified allowable non-stormwater discharges that were not previously certified.

c) The Permittee shall notify the Department within 14 days of any non-authorized discharge that cannot be easily eliminated. Appropriate actions may require coverage under an individual, industrial SPDES permit or connection to the sanitary sewer system.

d) Results of the dry weather flow inspections must be documented and retained on-site with the Stormwater Pollution Prevention Plan (SWPPP). The report must include the outfall locations, the inspection date and time, inspection personnel, description of discharges identified, the source of any discharges and actions taken to address any newly identified allowable non-stormwater discharges or elimination of non-authorized discharges.

Annual Benchmark Discharge Monitoring

a) Benchmark monitoring must be performed annually during the calendar year (between January 1 to December 31).

.b) The discharge limits are intended as a guideline for the permittee to determine the overall effectiveness of the SWPPP in controlling the discharge of pollutants. The concentrations do not constitute direct numeric effluent limitations; a benchmark exceedance, therefore in and of itself, is not a permit violation. It does, however, signal the need for the permittee to evaluate potential sources of stormwater contaminants at the facility.

c) Any sources of contamination that are identified must be remedied; such remedies may include implementation of non-structural or structural BMPs to prevent recurrence. The facility's SWPPP must be updated to reflect these revisions within 14 days of the inspection for items that can be readily resolved. More complicated maintenance or repairs shall be performed in accordance with the timeframes for more complicated maintenance and repairs described under Section 7.4 *Implementation Schedule, Maintenance, and Inspections* or Section 10.2 *Follow-up Actions*. If corrective actions at a facility do not result in achieving benchmark monitoring cut-off concentrations, the facility must continue efforts to implement additional BMPs. Failure to undertake and document the review or take. the necessary corrective actions are violations of the permit. Continued exceedance of benchmark monitoring cut-off concentrations may identify facilities that would be more appropriately covered under an individual SPDES permit.

d) Monitoring results must be reported in accordance with Section 6.2 and retained in accordance with Section 6.3.

Annual Benchmark Monitoring Requirements – Sector J

Pollutants of Concern	Analytical Method	Benchmark Monitoring Cut-Off Concentration
Total Suspended Solids	EPA 160.2	100 mg/l
pH		6.0-9.0 s.u.
Total Nitrogen	EPA 3501, 351.2, 353.2	750 ug/l
Total Phosphorus	EPA 365.1	1 mg/l
Total Recoverable Iron	EPA 200.7	82 ug/l
Total Recoverable Zinc	EPA 200.7	120 ug/l

Annual Benchmark Monitoring Requirements – Sector P

Pollutants of Concern	Analytical Method	Benchmark Monitoring Cut-Off Concentration
Oil & Grease	EPA 1664 or EPA 1664A	15 mg/l
Chemical Oxygen Demand (COD)	EPA 410.4	120 mg/l
Benzene	EPA 602	50 ug/l
Ethylbenzene	EPA 602	50 ug/l
Toluene	EPA 602	50 ug/l
Xylene	EPA 602	50 ug/l

Monitoring Instructions

a. Collection and analysis of samples – Sampling requirements must be assessed on an outfall by outfall basis. Samples must be collected as follows:

1) When and How to Sample – A minimum of one grab sample must be taken from the discharge associated with industrial activity resulting from a storm event with at least 0.1 inch of precipitation (defined as a "measurable" event), providing the interval from the preceding measurable storm is at least 72 hours. The 72-hour storm interval is waived if the preceding measurable storm did not result in a stormwater discharge (for example: a storm events in excess of 0.1 inches may not result in a stormwater discharge at some facilities), or if the permittee is able to document that less than a 72 hour interval is representative for local storm events during the sampling period. The grab sample must be taken during the first 30 minutes (or as soon thereafter as practical, but not to exceed one hour) of the discharge. If the sampled discharge commingles with process or non-process water, the permittee must attempt to sample the stormwater discharge before it mixes with the non-stormwater.

2) Sample Analysis – Monitoring and analysis must be conducted according to test procedures approved under 40 CFR Part 136, or equivalent, unless other test procedures have been specified in this Permit.

3) Any laboratory test or sample analysis required by this Permit for which the State Commissioner of Health issues certificates of approval pursuant to Section 502 of the Public Health Law shall be conducted by a laboratory that has been issued a certificate of approval.

b. Storm event data – Along with the monitoring results, the permittee must provide the date and duration (in hours) of the storm event(s) sampled; rainfall measurements or estimates

(in inches) of the storm event that generated the sampled runoff the duration between the storm event sampled and the end of the previous measurable (greater than 0.1 inch rainfall) storm event; and an estimate of the total volume (in gallons) of the discharge sampled.

c. Representative outfalls – If a facility has two or more outfalls that discharge substantially identical effluents, based on similarities of the industrial activities, significant materials or stormwater management practices occurring within the drainage areas of the outfalls, the permittee may test the effluent of just one of the outfalls and report that the quantitative data also applies to the substantially identical outfall(s). This outfall monitoring waiver for substantially identical discharges applies to quarterly visual monitoring as well, but does not apply to compliance monitoring for discharges subject to numerical effluent limitation guidelines. The permittee should collect a sample from the anticipated "worst case" outfall as indicated by the area or level of industrial activity. If the drainage areas are similar, or if all past monitoring has been below benchmark monitoring cutoff concentrations, permittee may vary which outfall is sampled as part of the monitoring, program. The permittee must include the following information in the SWPPP:

(1) The locations of the outfalls;

(2) Why the outfalls are expected to discharge substantially identical effluents;

(3) Estimates of the size of the drainage area (in square feet) for each of the outfalls; and

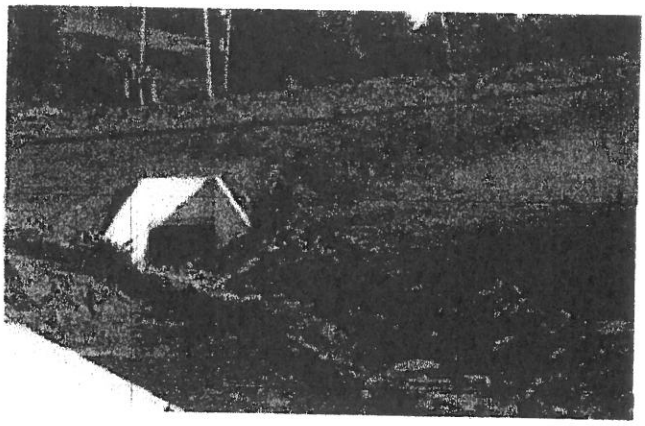
(4) An estimate of the runoff coefficient of the drainage areas (low: under 40%; medium: 40% to 6.5%; high: above 65%).

d. Monitoring Required by the Department – The Department may provide written notice to any facility including those otherwise exempt from the sampling requiring discharge sampling for specific parameters and a specific monitoring frequency. Any such notice will briefly state the reason for the monitoring, parameters to be monitored, frequency and period of monitoring, sample types and reporting requirements.

e. Monitoring Waiver – When adverse weather conditions prevent the collection of samples, a substitute sample may be taken during a qualifying storm event in the next monitoring period. Adverse weather conditions are those that are dangerous or create inaccessibility for personnel, and may include such things as local flooding, high winds, electrical storms, or situations that otherwise make sampling impracticable, such as drought or extended frozen conditions.

Appendix 13.5 Sample Best Management Practices

STANDARD AND SPECIFICATIONS FOR LINED WATERWAY OR OUTLET



Definition

A waterway or outlet with a lining of concrete, stone, or other permanent material. The lined section extends up the side slopes to the designed depth. The earth above the permanent lining may be vegetated or otherwise protected.

Purpose

To provide for the disposal of concentrated runoff without damage from erosion or flooding, where grassed waterways would be inadequate due to high velocities.

Scope

This standard applies to waterways or outlets with linings of *cast-in-place concrete, flagstone mortared in place, rock* riprap, gabions, or similar permanent linings. It does not apply to irrigation ditch or canal linings, grassed waterways with stone centers or small lined sections that carry prolonged low flows, or to reinforced concrete channels. The maximum capacity of the waterway flowing at design depth shall not exceed 100 cubic feet per second.

Conditions Where Practice Applies

This practice applies where the following or similar conditions exist:

1. Concentrated runoff is such that a lining is required to control erosion.

2. Steep grades, wetness, prolonged base flow, seepage, or piping that would cause erosion.

3. The location is such that damage from use by people or animals precludes use of vegetated waterways or outlets.

4. Soils are highly erosive or other soil and climate conditions preclude using vegetation.

5. High value property or adjacent facilities warrant the extra cost to contain design runoff in a limited space.

Design Criteria

Capacity

1. The minimum capacity shall be adequate to carry the peak rate of runoff from a 10-year, 24-hour storm. Velocity shall be computed using Manning's equation with a coefficient of roughness "n" as follows:

Lined Material	"n"
Concrete (Type):	
Trowel Finish	0.015
Float Finish	0.019
Gunite	0.019
Flagstone	0.022
Riprap	Determine from Figure 5B.11 on page 5B.19
Gabion	0.030

2. Riprap gradation and filter (bedding) are generally designed in accordance with criteria set forth in the National Cooperative Highway Research Program Report 108, available from the University Microfilm International, 300 N. Ree Road, Ann Arbor, Michigan 48016, Publication No. PB-00839; or the Hydraulic Engineering Circular No. 11, prepared by the U.S. Bureau of Public Roads, available from Federal Highway Administration, 400 7th Street, S.W., Washington, D.C. 20590, HNG-31, or the procedure in the USDA-NRCS's Engineering Field Manual, Chapter 16.

Velocity

1. Maximum design velocity shall be as shown below. Except for short transition sections, flow with a channel gradient within the range of 0.7 to 1.3 of this

flow's critical slope must be avoided unless the channel is straight. Velocities exceeding critical will be restricted to straight reaches.

Design Flow Depth (ft.)	Maximum Velocity (ft./sec.)
0.0 – 0.5	25
0.5 – 1.0	15
Greater than 1.0	10

2. Waterways or outlets with velocities exceeding critical shall discharge into an energy dissipater to reduce velocity to less than critical, or to a velocity the downstream soil and vegetative conditions will allow.

Cross Section

The cross section shall be triangular, parabolic, or trapezoidal. Monolithic concrete or gabions may be rectangular.

Freeboard

The minimum freeboard for lined waterways or outlets shall be 0.25 feet above design high water in areas where erosion resistant vegetation cannot be grown adjacent to the paved side slopes. No freeboard is required where good vegetation can be grown and is maintained.

Side Slope

Steepest permissible side slopes, horizontal to vertical will be as follows:

1. Non-Reinforced Concrete
   Hand-placed, formed concrete
   Height of lining, 1.5 ft or less..... Vertical
   Hand placed screened concrete or mortared
   In-place flagstone
   Height of lining, less than 2 ft..... 1 to 1
   Height of lining, more than 2 ft..... 2 to 1
2. Slip form concrete:
   Height of lining, less than 3 ft..... 1 to 1
3. Rock Riprap..... 2 to 1
4. Gabions..... Vertical
5. Pre-cast Concrete Sections..... Vertical

Lining Thickness

Minimum lining thickness shall be as follows:

1. Concrete.....4 in. (In most problem areas, shall be 5 in. with welded wire fabric reinforcing.)

2. Rock Riprap.....1.5 x maximum stone size plus thickness of filter or bedding.
3. Flagstone.....4 in. including mortar bed.

Related Structures

Side inlets, drop structures, and energy dissipaters shall meet the hydraulic and structural requirements of the site.

Filters or Bedding

Filters or bedding to prevent piping, reduce uplift pressure, and collect water will be used as required and will be designed in accordance with sound engineering principles. Weep holes and drains should be provided as needed.

Concrete

Concrete used for lining shall be so proportioned that it is plastic enough for thorough consolidation and stiff enough to stay in place on side slopes. A dense product will be required. A mix that can be certified as suitable to produce a minimum strength of at least 3,000 pounds per square inch will be required. Cement used shall be Portland Cement, Type I, II, IV, or V. Aggregate used shall have a maximum diameter of 1 ½ inches.

Weep holes should be provided in concrete footings and retaining walls to allow free drainage of water. Pipe used for weep holes shall be non-corrosive.

Mortar

Mortar used for mortared in-place flagstone shall consist of a mix of cement, sand, and water. Follow directions on the bag of mortar for proper mixing of mortar and water.

Contraction Joints

Contraction joints in concrete linings, where required, shall be formed transversely to a depth of about one third the thickness of the lining at a uniform spacing in the range of 10 to 15 feet.

Rock Riprap or Flagstone

Stone used for riprap or gabions shall be dense and hard enough to withstand exposure to air, water, freezing, and thawing. Flagstone shall be flat for ease of placement and have the strength to resist exposure and breaking. Rock riprap maximum size shall be as follows:

Velocity, f.p.s.	dmax, inches
5.0	6
8.5	12
10	18
12	24
15	36

A complete riprap gradations is provided in Table 5B.4, page 5B.38.

Cutoff Walls

Cutoff walls shall be used at the beginning and ending of concrete lining. For rock riprap lining, cutoff walls shall be keyed into the channel bottom and at both ends of the lining.

Construction Specifications

1. The foundation area shall be cleared of trees, stumps, roots, sod, loose rock, or other objectionable material.

2. The cross-section shall be excavated to the neat lines and grades as shown on the plans. Over-excavated areas shall be backfilled with moist soil compacted to the density of the surrounding material.

3. No abrupt deviations from design grade or horizontal alignment shall be permitted.

4. Concrete linings shall be placed to the thickness shown on the plans and finished in a workmanlike manner. Adequate precautions shall be taken to protect freshly placed concrete from extreme (hot or cold) temperatures, to ensure proper curing.

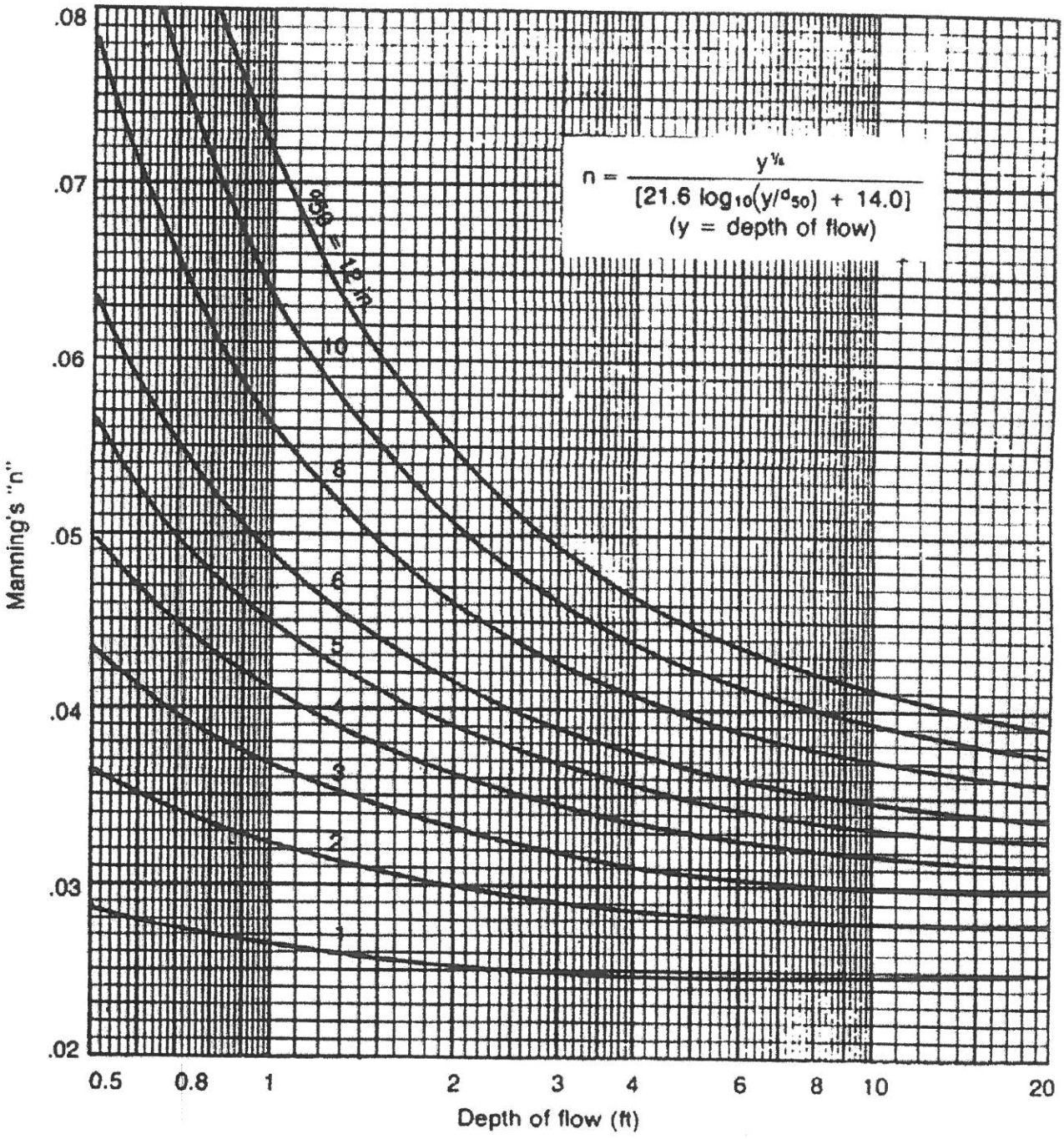
5. Filter bedding and rock riprap shall be placed to line and grade in the manner specified.
6. Construction operation shall be done in such a manner that erosion, air pollution, and water pollution will be minimized and held within legal limits. The completed job shall present a workmanlike appearance. All disturbed areas shall be vegetated or otherwise protected against soil erosion.

Maintenance

Pavement or lining should be maintained as built to prevent undermining and deterioration. Existing trees next to pavements should be removed, as roots can cause uplift damage.

Vegetation next to pavement should be maintained in good condition to prevent scouring if the pavement is overtopped. See Standard and Specifications for Permanent Critical Area Seeding on page 3.5.

Figure 5B.11
Determining "n" for Riprap Lined Channel using Depth of Flow
(USDA - NRCS)



STANDARD AND SPECIFICATIONS FOR DEBRIS BASIN

Definition

A barrier or dam constructed across a waterway or at other suitable locations to form a basin for catching and storing sediment and other waterborne debris.

Scope

This standard covers the installation of debris basins on sites where: (1) failure of the structure would not result in loss of life or interruption of use or service of public utilities; (2) the drainage area does not exceed 200 acres; and (3) the water surface area at the crest of the auxiliary spillway does not exceed 5 acres. For this purpose of this standard, debris basins are classified according to the following table:

Class	Maximum Drainage Area (Ac)	Maximum Height[1] of Dam (ft)	Auxiliary Spillway Required	Design Storm Frequency
1[2]	20	5	No	—
2	20	10	Yes	50 yrs.
3	200	20	Yes	100 yrs.

[1] Height is measured from the low point of original ground at the downstream toe to the top of dam.

[2] Class 1 basins are to be used only where site conditions are such that it is impractical to construct an auxiliary spillway in undisturbed ground.

Purpose

To provide a permanent or temporary means of trapping and storing sediment from eroding areas in order to protect properties or stream channels below the installation from damage by excessive sedimentation and debris.

Conditions Where Practice Applies

Where physical conditions or land ownership preclude the treatment of the sediment source by the installation of erosion control measures to reduce runoff and erosion. It may also be used as a permanent or temporary measure during grading and development of areas above. If a debris basin is used as a temporary structure, it may be removed once the development is complete and the area is permanently protected against erosion by vegetative or mechanical means.

Design Criteria

The capacity of the debris basin to the elevation of the crest of the service spillway is to equal the volume of the expected sediment yield from the unprotected portions of the drainage area during the planned useful life of the structure. The minimum volume of sediment in acre feet per year can be determined for various drainage areas under construction from curves on Figure 5B.21 on page 5B.44.

NOTE: All Debris Basins will be designed and constructed in accordance with the New York State Department of Environmental Conservation Dam Safety Section, "Guidelines for Design of Dams," and all applicable permits must be obtained.

Spillway Design

Runoff will be computed by the USDA-NRCS, TR-55, or other appropriate method. Runoff computations should be based upon the soil cover conditions expected to prevail during the construction period of the development.

For Class 2 basins, the combined capacities of the service and auxiliary spillways will be sufficient to pass the peak rate of runoff from a 50-year frequency storm after adjusting for flood routing.

For Class 3 basins, the combined capacities of the service and auxiliary spillways will be sufficient to pass the peak rate of runoff from a 100-year frequency storm.

Pipe Spillway

The pipe spillway will consist of a vertical pipe box type riser jointed to a conduit, which will extend through the embankment and outlet beyond the downstream toe of the fill. The minimum diameter of the conduit will be 8 inches.

The service spillway system will be perforated to provide for a gradual drawdown after each storm event. The minimum average capacity of the service spillway will be sufficient to discharge 5 inches of runoff from the drainage area in 24 hours (0.21 cfs per acre of drainage area). The riser of the service spillway shall be a cross-sectional area at least 1.3 times that of the barrel.

1. Crest Elevation: The crest elevation of the riser shall be at least 3 feet below the crest elevation of the embankment.

2. Perforated: Metal pipe risers shall be perforated with 1-1/2 inch diameter holes spaced 8 inches vertically and 10-12 inches horizontally around the pipe. Box type risers shall be ported or have some means for complete drainage of the sediment pool within a 5 day period following storm inflows.

3. Anti-vortex device: An anti-vortex device shall be installed on the top of the riser.

4. Base: The riser shall have a base attached with a watertight connection. The base shall have sufficient weight to prevent flotation of the riser.

5. Trash rack: An approved trash rack shall be firmly attached to the top of the riser if the pipe spillway conveys 25 percent or more of the peak rate of runoff from the design storm.

6. Anti-seepage measures: Anti-seep collars, or seepage diaphragms, shall be installed around the pipe conduit within the normal saturation zone when any of the following conditions exist:

   A. The settled height of dam exceeds 15 ft.

   B. The conduit is of smooth pipe 8 inches, or larger, in diameter.

   C. The conduit is of corrugated metal pipe 12 inches in diameter, or larger.
   The anti-seep collars and their connections to the pipe shall be watertight. The maximum spacing shall be approximately 14 times the minimum projection of the collar measured perpendicular to the pipe. In lieu of anti-seep collars, a seepage diaphragm can be used whose projections are three times the diameter of the pipe in all directions.

7. Outlet protection: Protection against scour at the discharge end of the pipe spillway shall be provided. Protective measures may include structures of the impact basin type, rock riprap, paving, revetment, excavation of plunge pool or use of other approved methods.

Auxiliary Spillway

Class 2 and 3 basins: An auxiliary spillway shall be excavated in undisturbed ground whenever site conditions permit. The auxiliary spillway cross section shall be trapezoidal with a minimum bottom width of 8 feet.

Class 1 basins: The embankment may be used as an auxiliary spillway. In these cases, the downstream slope of the embankment shall be 5:1 or flatter and the embankment must be immediately protected against erosion by means such as sodding, rock riprap, asphalt coating, or other approved methods.

1. Capacity: The minimum capacity of the auxiliary spillway shall be that required to pass the peak rate of runoff from the design storm, less any reduction due to flow in the pipe spillway.

2. Velocities: The maximum allowable velocity of flow in the exit channel shall be 6 feet per second for vegetated channels. For channels with erosion protection other than vegetation, velocities shall be in the safe range for the type of protection used.

3. Erosion protection: Provide for erosion protection by vegetation or by other suitable means such as rock riprap, asphalt, concrete, etc.

4. Freeboard: Freeboard is the difference between the design flow elevation in the auxiliary spillway and the top of the settled embankment. The minimum freeboard for Class 2 and Class 3 basins shall be 1 foot.

Embankment (Earth Fill)

Class 1 basins: The minimum top width shall be 10 feet. The upstream slope shall be no steeper than 3:1. The downstream slope shall be no steeper than 5:1.

Class 2 basins: The minimum top width shall be 8 feet. The combined upstream and downstream side slopes shall not be less than 5:1 with neither slope steeper than 2½:1.

Class 3 basins: The minimum top width shall be 10 feet. Side slopes shall be no steeper than 3:1.

Embankment (other than Earth Fill)

Class 1 basins only: The embankment may be constructed

of the following materials:

1. Pressure treated timber crib – rock filled
2. Precast reinforced concrete crib – rock filled
3. Gabions

When the above material is used for the embankment, a principal spillway is not required; however, the dam shall be pervious to allow for drainage during time of low inflow. Basins constructed of the above materials should be used only when the sediment to be trapped is coarse-grained material such as well graded gravel (GW) or poorly graded gravel (GP) material (Unified Soil Classification System).

Construction Specifications

Site Preparation

Areas under the embankment and any structural works shall be cleared, grubbed, and the topsoil stripped to remove trees, vegetation, roots, and other objectionable material. In order to facilitate cleanout and restoration, the pool area will be cleared of all brush and excess trees.

Cutoff Trench

A cutoff trench shall be excavated along the centerline of dam on earth fill embankments to a depth of at least 1.0 foot into a layer of slowly permeable material. The minimum depth shall be 2 feet. The cutoff trench shall extend up both abutments to the riser crest elevation. The minimum bottom width shall be 4 feet, but wide enough to permit operation of compaction equipment. The side slopes shall be the same as those for embankment. The trench shall be kept free from standing water during the backfilling operations.

Embankment

The fill material shall be taken from approved designated borrow areas. It shall be free of roots, woody vegetation, oversized stones, rocks, or other objectionable material. Areas on which fill is to be placed shall be scarified prior to placement of fill. The fill material should contain sufficient moisture so that it can be formed into a ball without crumbling. If water can be squeezed out of the ball, it is too wet for proper compaction.

Fill material will be placed in 6 to 9 inch layers and shall be continuous over the entire length of the fill. Compaction will be obtained by routing the hauling equipment over the fill so that the entire surface of the fill is traversed by at least one track width of the equipment, or compaction shall be achieved by the use of a compactor. The embankment shall be constructed to an elevation 10 percent higher than the design height to allow for settlement if compaction is obtained with hauling equipment. If compactors are used for compaction, the overbuild may be reduced to 5 percent.

Pipe Spillway

The riser shall be solidly attached to the barrel and all connections shall be watertight. The barrel and riser shall be placed on a firm foundation. The fill material around the pipe spillway will be placed in 4-inch layers and compacted to at least the same density as the adjacent embankment.

Auxiliary Spillway (Class 2 and 3 basins)

The auxiliary spillway shall be installed in undisturbed earth unless otherwise specified in the plan. The lines and grades must conform to those shown on the plans as nearly as skillful operation of the excavating equipment will permit.

Embankment (other than Earth Fill)

The rock used to fill cribbing or gabions will be hard and durable and of an approved size and gradation.

Erosion and Pollution Control

Construction operations will be carried out in such a manner that erosion and water pollution will be minimized. State and local laws concerning pollution abatement shall be complied with.

Safety

State requirements shall be met concerning fencing and signs warning the public of hazards of soft sediment and floodwater.

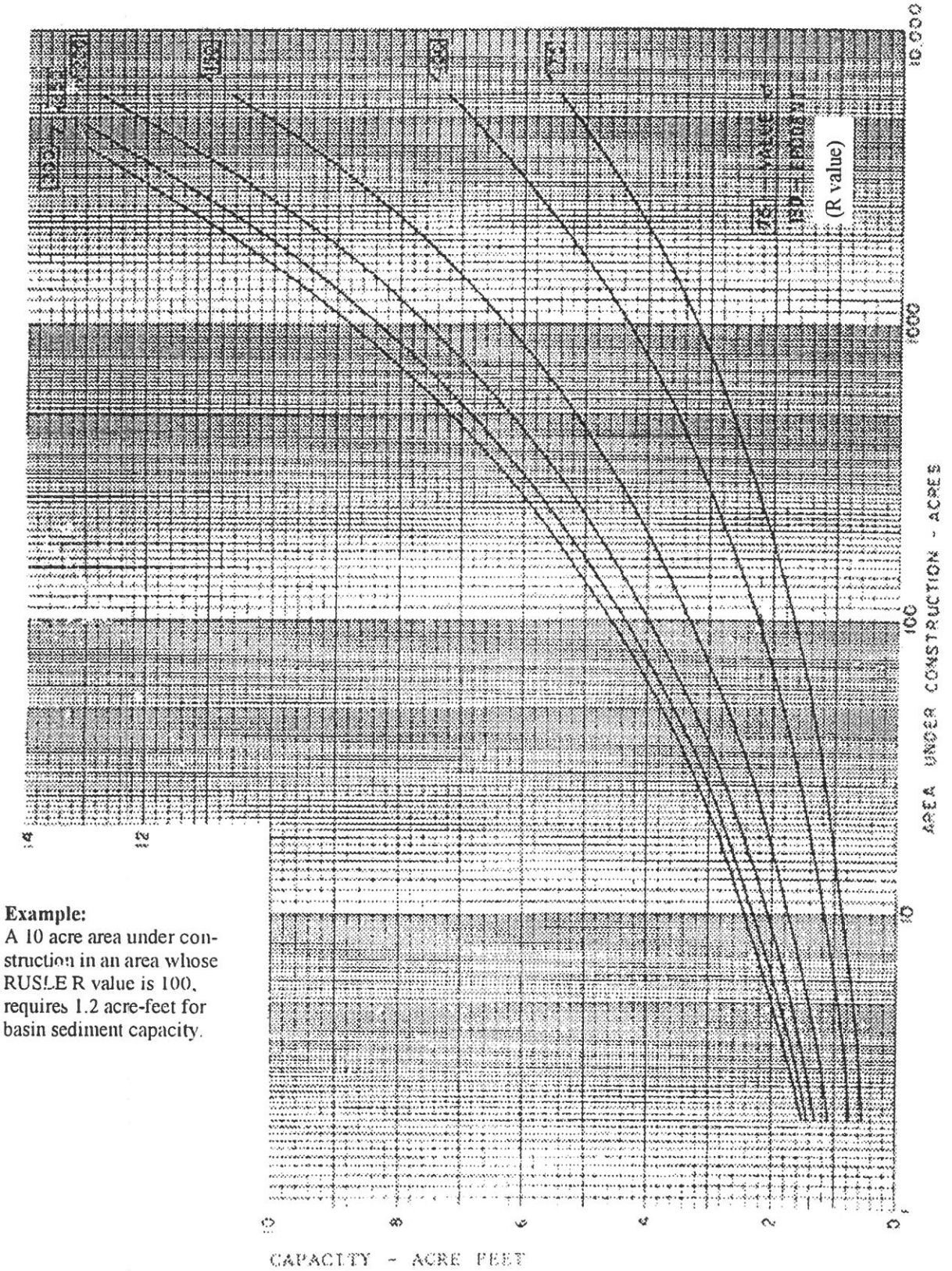
Seeding

Seeding, fertilizing, and mulching shall conform to the recommendations in Section 5, Vegetative Measures for Erosion and Sediment Control, of this manual.

Final Disposal

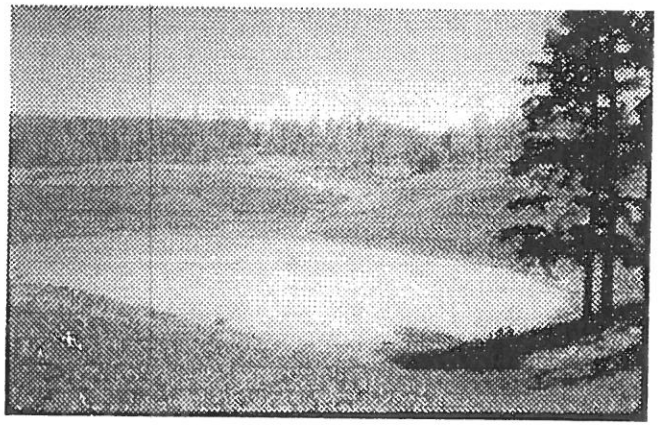
In the case of temporary structures, when the intended purpose has been accomplished and the drainage area properly stabilized, the embankment and resulting silt deposits are to be leveled, or otherwise disposed of in accordance with the plan.

Figure 5B.21
One-Year Debris Basin Sediment Capacity (USDA - NRCS)



Example:
A 10 acre area under construction in an area whose RUSLE R value is 100, requires 1.2 acre-feet for basin sediment capacity.

STANDARD AND SPECIFICATIONS FOR SEDIMENT BASIN



Definition

A temporary barrier or dam constructed across a drainage way or at other suitable locations to intercept sediment laden runoff and to trap and retain the sediment.

Scope

This standard applies to the installation of temporary sediment basins on sites where: (a) failure of the structure would not result in loss of life, damage to homes or buildings, or interruption of use or service of public roads or utilities; (b) the drainage area does not exceed 100 acres; and (c) the basin is to be removed within 36 months after the beginning of construction of the basin.

Permanent (to function more than 36 months) sediment basins, or temporary basins exceeding the classification requirements for class 1 and 2, or structures that temporarily function as a sediment basin but are intended for use as a permanent pool shall be classified as permanent structures and shall conform to criteria appropriate for permanent structures. These structures shall be designed and constructed to conform to NRCS Standard And Specification No. 378 for Ponds in the National Handbook of Conservation Practices and the New York State Department of Environmental Conservation, "Guidelines for the Design of Dams." The total volume of permanent sediment basins shall equal to or exceed the capacity requirements for temporary basins contained herein.

Classification of Temporary Sediment Basins

For the purpose of this standard, temporary sediment basins are classified as follows:

Class	1	2
Max. Drainage Area (acres)	100	100
Max. Height[1] of Dam (ft.)	10	15
Min. Embankment Top Width	8	10
Embankment Side Slopes	2:1 or Flatter	2 ½:1 or Flatter
Anti-Seep Control Required	Yes	Yes

[1] Height is measured from the low point of original ground at the downstream toe of the dam to the top of the dam.

Purpose

The purpose of a sediment basin is to intercept sediment-laden runoff and reduce the amount of sediment leaving the disturbed area in order to protect drainage ways, properties, and rights-of-way below the sediment basin.

Conditions Where Practice Applies

A sediment basin is appropriate where physical site conditions or land ownership restrictions preclude the installation of other erosion control measures to adequately control runoff, erosion, and sedimentation. However, it is strongly encouraged to use a basin in addition to other ESC measures if practicable. It may be used below construction operations which expose critical areas to soil erosion. The basin shall be maintained until the disturbed area is protected against erosion by permanent stabilization.

Design Criteria

Compliance with Laws and Regulations

Design and construction shall comply with state and local laws, ordinances, rules and regulations, including permits.

Location

The sediment basin should be located to obtain the maximum storage benefit from the terrain and for ease of cleanout of the trapped sediment. It should be located to minimize interference with construction activities and

construction of utilities. Whenever possible, sediment basins should be located so that storm drains may outfall or be diverted into the basin. **Do not locate basins in perennial streams.**

Size and Shape of the Basin

The minimum sediment storage volume of the basin, as measured from the bottom of the basin to the elevation of the crest of the principal spillway shall be at least 3,600 cubic feet per acre draining to the basin. This 3,600 cubic feet is equivalent to one inch of sediment per acre of drainage area. The entire drainage area is used for this computation, rather than the disturbed area above, to maximize trapping efficiency. The length to width ratio shall be greater than 2:1, where length is the distance between the inlet and outlet. A wedge shape shall be used with the inlet located at the narrow end.

Surface Area

Recent studies (Barfield and Clar 1985; Pitt, 2003) indicate that the following relationship between surface area and peak inflow rate gives a trapping efficiency of 75% for silt loam soils, and greater than 90% for loamy sand soils:

$A = 0.01\ Qp$ or, $A = 0.015x\ D.A.$
(whichever is greater)
where,

A = the basin surface area, acres, measured at the service spillway crest; and

Qp = the peak inflow rate for the design storm.
(The minimum design storm will be a 10 year, 24 hour storm under construction conditions).

D.A. = contributing drainage area.

One half of the design sediment storage volume (67 cubic yards per acre drainage area) shall be in the form of a permanent pool, and the remaining half as drawdown volume.

Sediment basins shall be cleaned out when the permanent pool volume remaining as described above is reduced by 50 percent, except in no case shall the sediment level be permitted to build up higher than one foot below the principal spillway crest. At this elevation, cleanout shall be performed to restore the original design volume to the sediment basin.

The elevation corresponding to the maximum allowable sediment level shall be determined and shall be stated in the design data as a distance below the top of the riser and shall be clearly marked on the riser.

The basin dimensions necessary to obtain the required basin volume as stated above shall be clearly shown on the plans to facilitate plan review, construction, and inspection.

Spillway Design

Runoff shall be computed by the method outlined in: Chapter 2, Estimating Runoff, Engineering Field Handbook available in the Natural Resources Conservation Service offices or, by TR-55, Urban Hydrology for Small Watersheds. **Runoff computations shall be based upon the worst soil cover conditions expected to prevail in the contributing drainage area during the anticipated effective life of the structure.** The combined capacities of the principal and emergency spillway shall be sufficient to pass the peak rate of runoff from a ten-year frequency storm.

1. Principal spillway: A spillway consisting of a vertical pipe or box type riser joined (watertight connection) to a pipe (barrel) which shall extend through the embankment and outlet beyond the downstream toe of the fill. The minimum capacity of the principal spillway shall be 0.2 cfs per acre of drainage area when the water surface is at the emergency spillway crest elevation. For those basins with no emergency spillway, the principal spillway shall have the capacity to handle the peak flow from a ten-year frequency rainfall event. The minimum size of the barrel shall be 8 inches in diameter. See Figures 5A.25, 5A.26, and 5A.27 on pages 5A.60, 5A.61, and 5A.62 for principal spillway sizes and capacities.

A. Crest elevation: When used in combination with an emergency spillway, the crest elevation of the riser shall be a minimum one foot below the elevation of the control section of the emergency spillway.

B. Watertight riser and barrel assembly: The riser and all pipe connections shall be completely watertight except for the inlet opening at the top, or a dewatering opening. There shall not have any other holes, leaks, rips, or perforations in the structure.

C. Dewatering the basin: The drawdown volume will be discharged over a 10 hour period. The size of the orifice to provide this control can be approximated as follows:

$$A_o = \frac{A_s \times 2h^{0.5}}{T \times Cd \times 20.428} \quad \text{therefore,} \quad Ao = \frac{A_s \times 2h^{0.5}}{122.568}$$

where,
Ao = surface area of the dewatering orifice
As = surface area of the basin
h = head of water above orifice
Cd = coefficient of contraction for an orifice (0.6)
T = detention time needed to dewater the basin (10 hours)

D. Anti-vortex device and trash rack: An anti-vortex device and trash rack shall be securely installed on top of the riser and shall be the concentric type as shown in Figure 5A.29(1) and 5A.29(2) on pages 5A.64 and 5A.65.

E. Base: The riser shall have a base attached with a

watertight connection and shall have sufficient weight to prevent flotation of the riser. Two approved bases for risers ten feet or less in height are: 1) a concrete base 18 in. thick with the riser embedded 9 in. in the base, and 2) a ¼" minimum thickness steel plate attached to the riser by a continuous weld around the circumference of the riser to form a watertight connection. The plate shall have 2.5 feet of stone, gravel, or compacted earth placed on it to prevent flotation. In either case, each side of the square base shall be twice the riser diameter.

For risers greater than ten feet high, computations shall be made to design a base which will prevent flotation. The minimum factor of safety shall be 1.20 (Downward forces = 1.20 x upward forces). See Figure 5A.30 on page 5A.66 for details.

F. Anti-Seep Collars: Anti-seep collars shall be installed around all conduits through earth fills of impoundment structures according to the following criteria:

1) Collars shall be placed to increase the seepage length along the conduit by a minimum of 15 percent of the pipe length located within the saturation zone.

2) Collar spacing shall be between 5 and 14 times the vertical projection of each collar.

3) All collars shall be placed within the saturation zone.

4) The assumed normal saturation zone (phreatic line) shall be determined by projecting a line at a slope of 4 horizontal to 1 vertical from the point where the normal water (riser crest) elevation touches the upstream slope of the fill to a point where this line intersects the invert of the pipe conduit. All fill located within this line may be assumed as saturated.

When anti-seep collars are used, the equation for revised seepage length becomes:

$2(N)(P)=1.15(L_s)$ or,
$N=(0.075)(L_s)/P$

Where: Ls = Saturated length is length, in feet, of pipe between riser and intersection of phreatic line and pipe invert.

N = number of anti-seep collars.

P = vertical projection of collar from pipe, in feet.

5) All anti-seep collars and their connections shall be watertight.
See Figure 5A.31(1) and 5A.31(2) on pages 5A.67 and 5A.68 for anti-seep collar design and Figure 5A.32 on page 5A.69 for construction details. Seepage diaphragms may be used in lieu of anti-seep collars. They shall be designed in accordance to USDA NRCS Pond Standard 378.

G. Outlet: An outlet shall be provided, including a means of conveying the discharge in an erosion free manner to an existing stable channel. Where discharge occurs at the property line, drainage easements will be obtained in accordance with local ordinances. Adequate notes and references will be shown on the erosion and sediment control plan.

Protection against scour at the discharge end of the pipe spillway shall be provided. Measures may include basin, riprap, revetment, excavated plunge pools, or other approved methods. See Standard and Specification for Rock Outlet Protection, page 5B.21.

2. Emergency Spillways: The entire flow area of the emergency spillway shall be constructed in undisturbed ground (not fill). The emergency spillway cross-section shall be trapezoidal with a minimum bottom width of eight feet. This spillway channel shall have a straight control section of at least 20 feet in length; and a straight outlet section for a minimum distance equal to 25 feet.

A. Capacity: The minimum capacity of the emergency spillway shall be that required to pass the peak rate of runoff from the 10 year 24-hour frequency storm, less any reduction due to flow in the pipe spillway. Emergency spillway dimensions may be determined by using the method described in Figure 5A.33 on page 5A.70.

B. Velocities: The velocity of flow in the exit channel shall not exceed 5 feet per second for vegetated channels. For channels with erosion protection other than vegetation, velocities shall be within the non-erosive range for the type of protection used.

C. Erosion Protection: Erosion protection shall be provided for by vegetation as prescribed in this publication or by other suitable means such as riprap, asphalt or concrete.

D. Freeboard: Freeboard is the difference between the design high water elevation in the emergency spillway and the top of the settled embankment. If there is no emergency spillway, it is the difference between the water surface elevation required to pass the design flow through the pipe and the top of the settled embankment. Freeboard shall be at least one foot.

Embankment Cross-Section

Class 1 Basins: The minimum top width shall be eight feet. The side slopes shall not be steeper than 2:1.

Class 2 Basins: The minimum top width shall be ten feet. The side slopes shall not be steeper than 2 ½:1.

Entrance of Runoff into Basin

Points of entrance of surface runoff into excavated sediment basins shall be protected to prevent erosion. Considerable care should be given to the major points of inflow into basins. In many cases the difference in elevation of the inflow and the bottom of the basin is considerable, thus creating a potential for sever gullying and sediment generation. Often a riprap drop at major points of inflow would eliminate gullying and sediment generation.

Diversions, grade stabilization structures or other water control devices shall be installed as necessary to ensure direction of runoff and protect points of entry into the basin. Points of entry should be located so as to ensure maximum travel distance of entering runoff to point of exit (the riser) from the basin.

Disposal

The sediment basin plans shall indicate the method(s) of disposing of the sediment removed from the basin. The sediment shall be placed in such a manner that it will not erode from the site. The sediment shall not be deposited downstream from the basin, adjacent to a stream or floodplain. Disposal sites will be covered by an approved sediment control plan.

The sediment basis plans shall also show the method of disposing of the sediment basin after the drainage area is stabilized, and shall include the stabilization of the sediment basin site. Water contained within the storage areas shall be removed from the basin by pumping, cutting the top of the riser, or other appropriate method prior to removing or breaching the embankment. Sediment shall not be allowed to flush into a stream or drainage way.

Chemical Treatment

Precipitation of sediment is enhanced with the use of specific chemical flocculants that can be applied to the sediment basin in liquid, powder, or solid form. Flocculants include polyacrylimides, aluminum sulfate (alum), and polyaluminum chloride. Cationic polyelectrolytes have a greater toxicity to fish and other aquatic organisms than anionic polyelectrolytes because they bind to the gills of fish resulting in respiratory failure (Pitt, 2003).

Chemical treatment shall not be substituted for proper erosion and sediment control. To reduce the need for flocculants, proper controls include planning, phasing, sequencing and practice design in accordance to NY Standards. Chemical applications shall not be applied without written approval from the NYSDEC.

Safety

Sediment basins are attractive to children and can be very dangerous. Local ordinances and regulations must be adhered to regarding health and safety. The developer or owner shall check with local building officials on applicable safety requirements. If fencing of sediment basins is required, the location of and type of fence shall be shown on the plans.

Construction Specifications

Site Preparation

Areas under the embankment shall be cleared, grubbed, and stripped of topsoil to remove trees, vegetation, roots, or other objectionable material. In order to facilitate cleanout and restoration, the pool area (measured at the top of the pipe spillway) will be cleared of all brush, trees, and other objectionable materials.

Cutoff-Trench

A cutoff trench shall be excavated along the centerline of earth fill embankments. The minimum depth shall be two feet. The cutoff trench shall extend up both abutments to the riser crest elevation. The minimum bottom width shall be four feet, but wide enough to permit operation of excavation and compaction equipment. The side slopes shall be no steeper than 1:1. Compaction requirements shall be the same as those for embankment. The trench shall be dewatered during the back-filling/compaction operations.

Embankment

The fill material shall be taken from approved areas shown on the plans. It shall be clean mineral soil free of roots, woody vegetation, oversized stones, rocks, or other objectionable material. Relatively pervious materials such as sand or gravel (Unified Soil Classes GW, GP, SW & SP) shall not be placed in the embankment. Areas on which fill is to be placed shall be scarified prior to placement of fill. The fill material shall contain sufficient moisture so that it can be formed by hand into a ball without crumbling. If water can be squeezed out of a ball, it is too wet for proper compaction. Fill material shall be placed in six to eight-inch thick continuous layers over the entire length of the fill. Compaction shall be obtained by routing and hauling the construction equipment over the fill so that the entire surface of each layer of the fill is traversed by at least one wheel or tread track of the equipment or by the use of a compactor. The embankment shall be constructed to an elevation 10 percent higher than the design height to allow for settlement.

Pipe Spillway

The riser shall be securely attached to the barrel or barrel stub by welding the full circumference making a watertight structural connection. The barrel stub must be attached to the riser at the same percent (angle) of grade as the outlet conduit. The connection between the riser and the riser base shall be watertight. All connections between barrel sections must be achieved by approved watertight bank assemblies. The barrel and riser shall be placed on a firm, smooth foundation of impervious soil. Pervious materials such as sand, gravel, or crushed stone shall not be used as backfill around the pipe or anti-seep collars. The fill material around the pipe spillway shall be placed in four-inch layers and compacted under and around the pipe to at least the same density as the adjacent embankment.

A minimum depth of two feet of hand compacted backfill shall be placed over the pipe spillway before crossing it with construction equipment. Steel base plates on risers shall have at least 2 ½ feet of compacted earth, stone, or gravel placed over it to prevent flotation.

Emergency Spillway

The emergency spillway shall be installed in undisturbed ground. The achievement of planned elevations, grades, design width, entrance and exit channel slopes are critical to the successful operation of the emergency spillway and must be constructed within a tolerance of +/- 0.2 feet.

Vegetative Treatment

Stabilize the embankment and emergency spillway in accordance with the appropriate vegetative standard and specification immediately following construction. In no case shall the embankment remain unstabilized for more than seven (7) days.

Erosion and Pollution Control

Construction operations shall be carried out in such a manner that erosion and water pollution will be minimized. State and local laws shall be complied with concerning pollution abatement.

Safety

State and local requirements shall be met concerning fencing and signs, warning the public of hazards of soft sediment and floodwater.

Maintenance

1. Repair all damages caused by soil erosion and construction equipment at or before the end of each working day.

2. Sediment shall be removed from the basin when it reaches the specified distance below the top of the riser (shall not exceed 50 percent capacity). This sediment shall be placed in such a manner that it will not erode from the site. The sediment shall not be deposited downstream from the embankment, adjacent to a stream or floodplain.

Final Disposal

When temporary structures have served their intended purpose and the contributing drainage area has been properly stabilized, the embankment and resulting sediment deposits are to be leveled or otherwise disposed of in accordance with the approved sediment control plan. The proposed use of a sediment basin site will often dictate final disposition of the basin and any sediment contained therein. If the site is scheduled for future construction, then the basin material and trapped sediments must be removed, safely disposed of, and backfilled with a structural fill. When the basin area is to remain open space, the pond may be pumped dry, graded, and back filled.

Information to be Submitted

Sediment basin designs and construction plans submitted for review to a local municipality, Soil and Water Conservation District, or other agency shall include the following:

1. Specific location of the basin.

2. Plan view of the storage basin and emergency spillway, showing existing and proposed contours.

3. Cross section of dam, principal spillway, emergency spillway, and profile of emergency spillway.

4. Details of pipe connections, riser to pipe connections, riser base, anti-seep control, trash rack cleanout elevation, and anti-vortex device.

5. Runoff calculations for 1 and 10-year frequency storms, if required.

6. Storage Computation
   A. Total required
   B. Total Available
   C. Level of sediment at which cleanout shall be required; to be stated as a distance from the riser crest to the sediment surface.

7. Calculations showing design of pipe and emergency spillway.

Note: Items 5 through 7 above may be submitted using the design data sheet on pages 7A.54 through 7A.59.

TEMPORARY SEDIMENT BASIN DESIGN DATA SHEET

Computed by_____Date_____Checked by_____Date_____
Project_____Basin #_____
Location_____Total Area draining to basin _____Acres

BASIN SIZE DESIGN

1. Minimum sediment storage volume = 134 cu. yds. x_____acres of drainage area = _____cu.yds.
2. a. Cleanout at 50 percent of minimum required volume = _____cu. yds.
   b. Elevation corresponding to scheduled time to clean out_____
   c. Distance below top of riser_____feet
3. Minimum surface area is larger of 0.01 $Q_{(1)}$_____or, 0.015 DA = _____ use _____acres

DESIGN OF SPILLWAYS & ELEVATIONS

Runoff

4. $Q_{p(10)}$ = _____cfs
   (EFH, Ch. 2, TR-55, or Section 4; Attach runoff computation sheet)

Pipe Spillway (Q_{ps})

5. Min. pipe spillway cap.. Q_{ps} = 0.2 x_____ac. Drainage = _____cfs
   Note: If there is no emergency spillway, then req'd Q_{ps} = $Q_{p(10)}$ = _____cfs.
6. H = _____ft. Barrel length = _____ft
7. Barrel: Diam. _____inches; Q_{ps} = (Q)_____x (cor.fac.)_____=_____cfs.
8. Riser: Diam. _____inches; Length_____ft.; h = _____ft. Crest Elev. _____
9. Trash Rack: Diam._____inches; H = _____inches

Emergency Spillway Design

10. Emergency Spillway Flow, Q_{es} = Q_p - Q_{ps} = _____ - _____ = _____cfs.
11. Width _____ft.; H_p_____ft Crest elevation _____; Design High Water Elev. _____
    Entrance channel slope_____% ; Top of Dam Elev. _____
    Exit channel slope _____%

ANTI-SEEP COLLAR/ SEEPAGE DIAPHRAGM DESIGN

Collars:

12. y = _____ft.; z = _____:1; pipe slope = _____%, L_s = _____ft.
    Use_____collars, _____ - _____inches square; projection = _____ft.

Diaphragms:

#_____ width_____ ft. height_____ft.

DEWATERING ORIFICE SIZING

13. $Ao = \frac{A_s \times (2h)^{0.5}}{122{,}568}$ = _____sq. ft.; h = _____ ft.; therefore use, _____

TEMPORARY SEDIMENT BASIN DESIGN DATA SHEET INSTRUCTIONS FOR USE OF FORM

1. Minimum required sediment storage volume is 134 cubic yards (3600 cubic feet) per acre from each acre of drainage area. Values larger than 134 cubic yards per acre may be used for greater protection. Compute volume using entire drainage area although only part may be disturbed.

2. The volume of a naturally shaped basin (no excavation in basin) may be approximated by the formula V = (0.4)(A)(d), where V is in cubic feet, A is the surface area of the basin, in square feet, and d is the maximum depth of the basin, in feet. Volume may be computed from contour information or other suitable methods.

3. If volume of basin is not adequate for required storage, excavate to obtain the required volume.

4. The minimum surface area of the basin pool at the storage volume elevation will be the larger of the two elevations shown.

5 USDA-NRCS TR-55 or the NRCS Engineering Field Handbook, Chapter 2, are the preferred methods for runoff computation. Runoff curve numbers will be computed for the drainage area that reflects the maximum construction condition.

6. Required minimum discharge from pipe spillway equals 0.2 cfs/ac. times total drainage area. (This is equivalent to a uniform runoff of 5 in. per 24 hours). The pipe shall be designed to carry Q_p if site conditions preclude installation of an emergency spillway to protect the structure.

7. Determine value of "H" from field conditions; "H" is the interval between the centerline of the outlet pipe and the emergency spillway crest, or if there is no emergency spillway, to the design high water.

8. See Pipe Spillway Design Charts, Figures 5A.26 and 5A.27 on pages 5A.61 and 5A.62.

9. See Riser Inflow Curves, Figure 5A.25 on page 5A.60.

10. Compute the orifice size required to dewater the basin over a 10 hour period.

11. See Trash Rack and Anti-Vortex Device Design, Figures 5A.29 on pages 5A.64 and 5A.65.

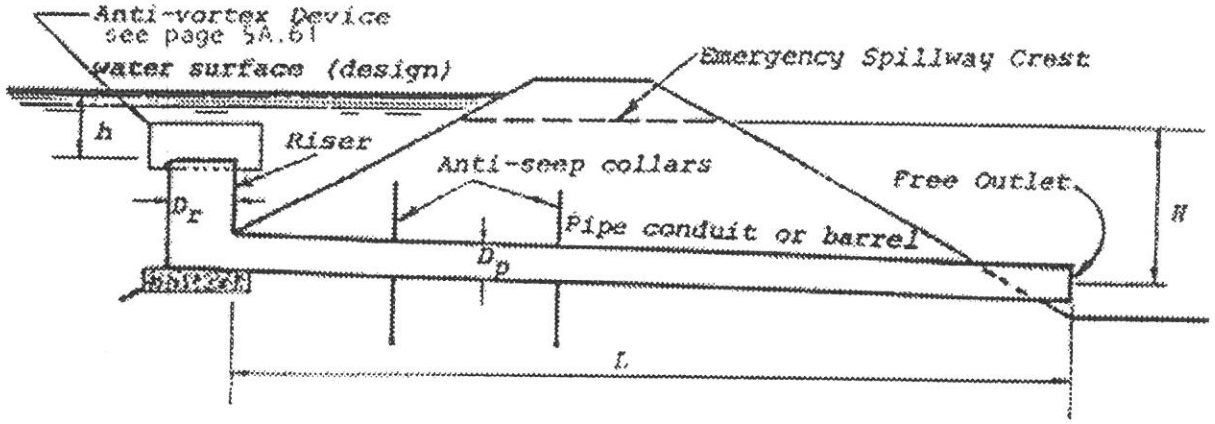
12. Compute Q_{es} by subtracting actual flow carried by the pipe spillway from the total inflow, Q_p.

13. Use appropriate tables to obtain values of H_p, bottom width, and actual Q_{es}. If no emergency spillway is to be used, so state, giving reason(s).

14. See Anti-Seep Collar / Seepage Diaphragm Design.

15. Fill in design elevations. The emergency spillway crest must be set no closer to riser crest than value of h, which causes pipe spillway to carry the minimum, required Q. Therefore, the elevation difference between spillways shall be equal to the value of h, or one foot, whichever is greater. Design high water is the elevation of the emergency spillway crest plus the value of H_p, or if there is no emergency spillway, it is the elevation of the riser crest plus h required to handle the 10-year storm. Minimum top of dam elevation requires 1.0 ft. of freeboard above design high water.

Pipe Spillway Design



H = Head on pipe spillway (pipe flow), ft. (centerline of outlet to emergency spillway crest or to design high water if no emergency spillway)

h = Head over riser crest, ft.

L = Length of pipe in ft.

D_p = Diameter of pipe conduit (barrel)

Dr = Diameter of riser

To use charts for pipe spillway design:

- Enter chart, Figures 5A.26 and 5A.27 on Pages 5A.61 and 5A.62 with H and required discharge.
- Find diameter of pipe conduit that provides equal or greater discharge
- Enter chart, Figure 5A.25 on Page 5A.60 with actual pipe discharge. Read across to select smallest riser that provides discharge within weir flow portion of rating curve. Read down to find corresponding h required. This h must be 1 foot or less.

Example:

Given: Q (required) = 5.8 cfs, L = 60 ft., H = 9 ft. to centerline of pipe = Free outlet
Find: Pipe size, actual Q and size of riser, use corrugated metal pipe, n = 0.025

Q of 12 in. pipe = 5.95 cfs x (correction factor) 1.07 = 6.4 cfs from the Pipe Flow Chart. From Riser Inflow Curves (Figures 5A.25 on page 5A .60), smallest riser = 18 in. (@ h = 0.60).

Design Example #1

Snooks Pond is a senior citizen assisted living center under construction. A sediment basin will be utilized as a component of the erosion and sediment control plan for the project. The Drainage area to the basin is 20 acres, the one year storm peak discharge is 32 cubic feet per second, and 88 cfs for the 10 year storm based on analysis of the site under maximum construction condition. Design the sediment basin when the overall head (H) is 10 feet and the smooth steel pipe spillway is used. An emergency spillway can be constructed on the site. Base the design volumes and elevations on the stage storage curve developed for the natural topography or as excavated

(see Page 5A.58).

Design Example # 2

Us the same data as example #1, but no emergency spillway is possible (see Page 7A. 59).

Notes:

1. Use a 1.0 foot minimum between riser crest and emergency spillway crest, thus riser crest = 1.0 ft.

2. To provide 50% of the storage as permanent pool, the dewatering orifice is set at the out elevation.

Figure 5A.23
Sediment Basin

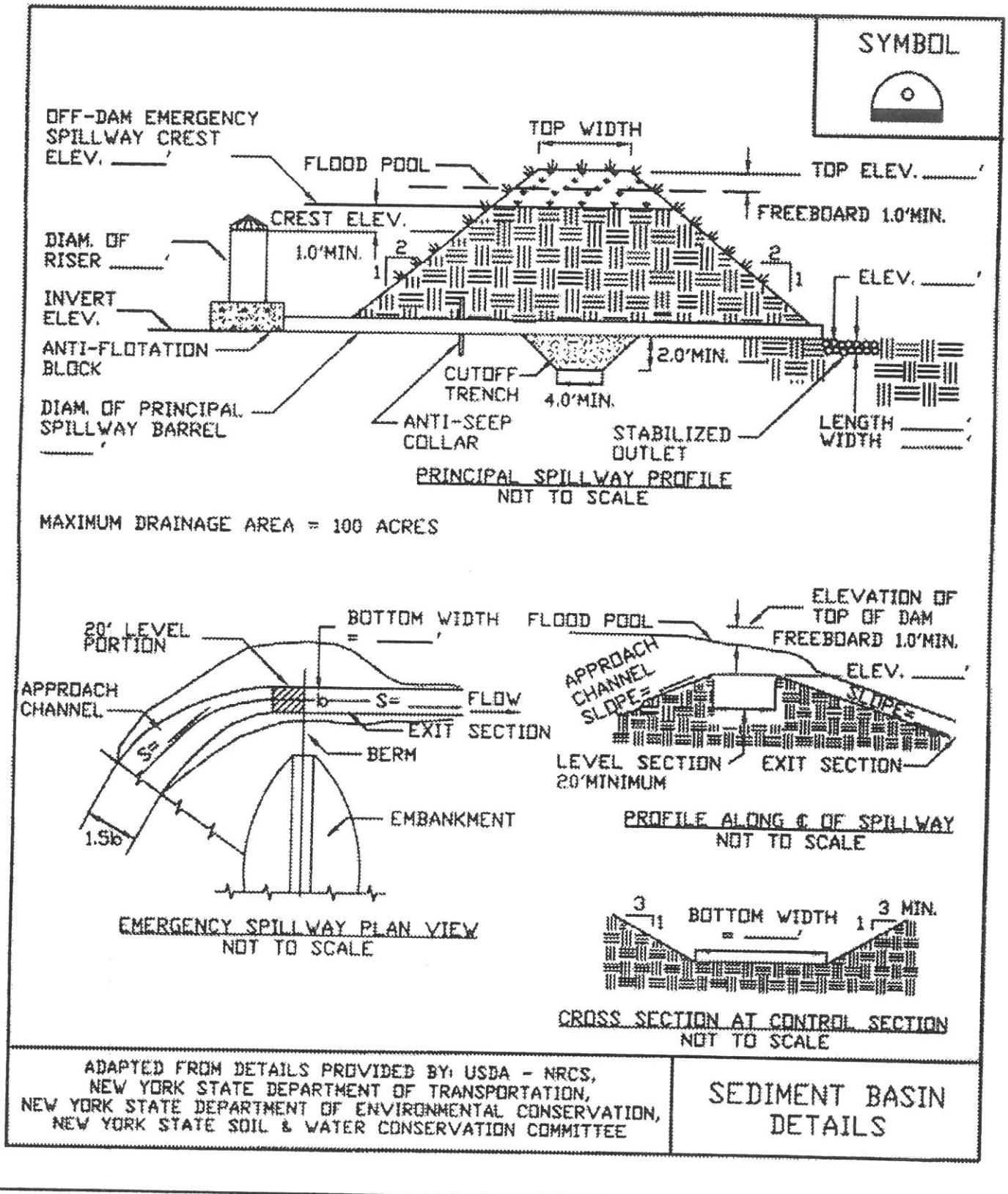
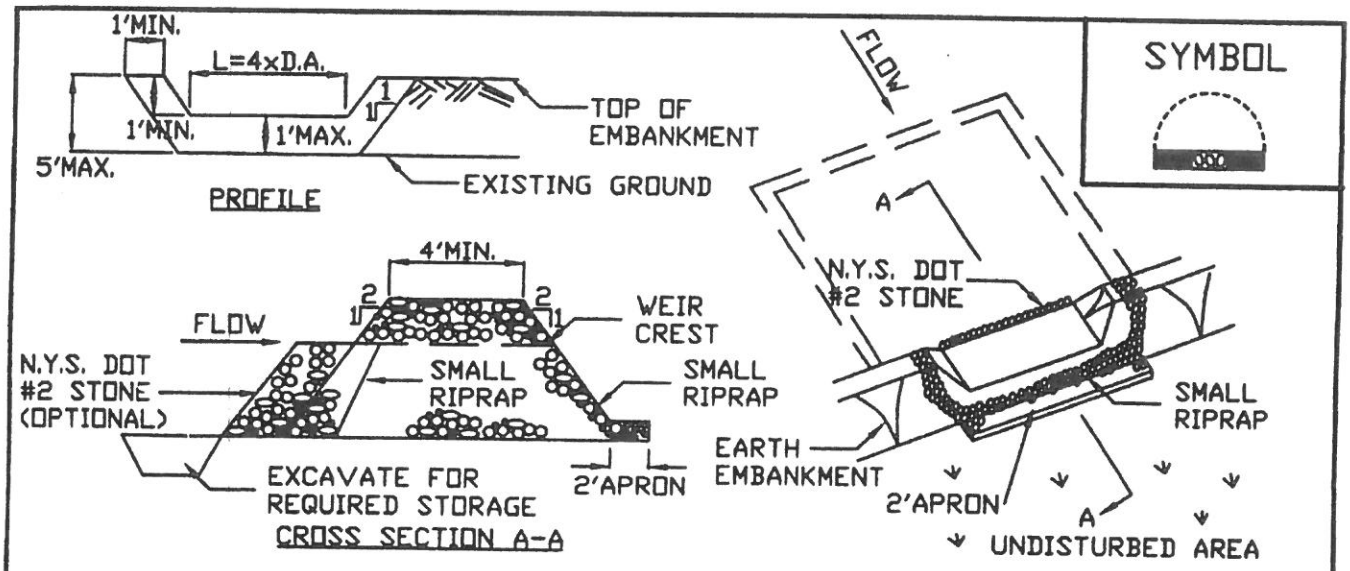


Figure 5A.19
Stone Outlet Sediment Trap: ST-IV



OPTION: A ONE FOOT LAYER OF N.Y.S. DOT #2 STONE MAY BE PLACED ON THE UPSTREAM SIDE OF THE RIPRAP INPLACE OF THE EMBEDDED FILTER CLOTH.

CONSTRUCTION SPECIFICATIONS

1. AREA UNDER EMBANKMENT SHALL BE CLEARED, GRUBBED AND STRIPPED OF ANY VEGETATION AND ROOT MAT. THE POOL AREA SHALL BE CLEARED.
2. THE FILL MATERIAL FOR THE EMBANKMENT SHALL BE FREE OF ROOTS AND OTHER WOODY VEGETATION AS WELL AS OVER-SIZED STONES, ROCKS, ORGANIC MATERIAL OR OTHER OBJECTIONABLE MATERIAL. THE EMBANKMENT SHALL BE COMPACTED BY TRAVERSING WITH EQUIPMENT WHILE IT IS BEING CONSTRUCTED.
3. ALL CUT AND FILL SLOPES SHALL BE 2:1 OR FLATTER.
4. THE STONE USED IN THE OUTLET SHALL BE SMALL RIPRAP 4"-8" ALONG WITH A 1' THICKNESS OF 2" AGGREGATE PLACED ON THE UP-GRADE SIDE ON THE SMALL RIPRAP OR EMBEDDED FILTER CLOTH IN THE RIPRAP.
5. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. IT SHALL BE PLACED ON SITE AND STABILIZED.
6. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NEEDED.
7. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND SEDIMENT ARE CONTROLLED.
8. THE STRUCTURE SHALL BE REMOVED AND THE AREA STABILIZED WHEN THE DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.

MAXIMUM DRAINAGE AREA 5 ACRES

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	STONE OUTLET SEDIMENT TRAP ST-IV

Figure 5A.25
Riser Inflow Chart (USDA - NRCS)

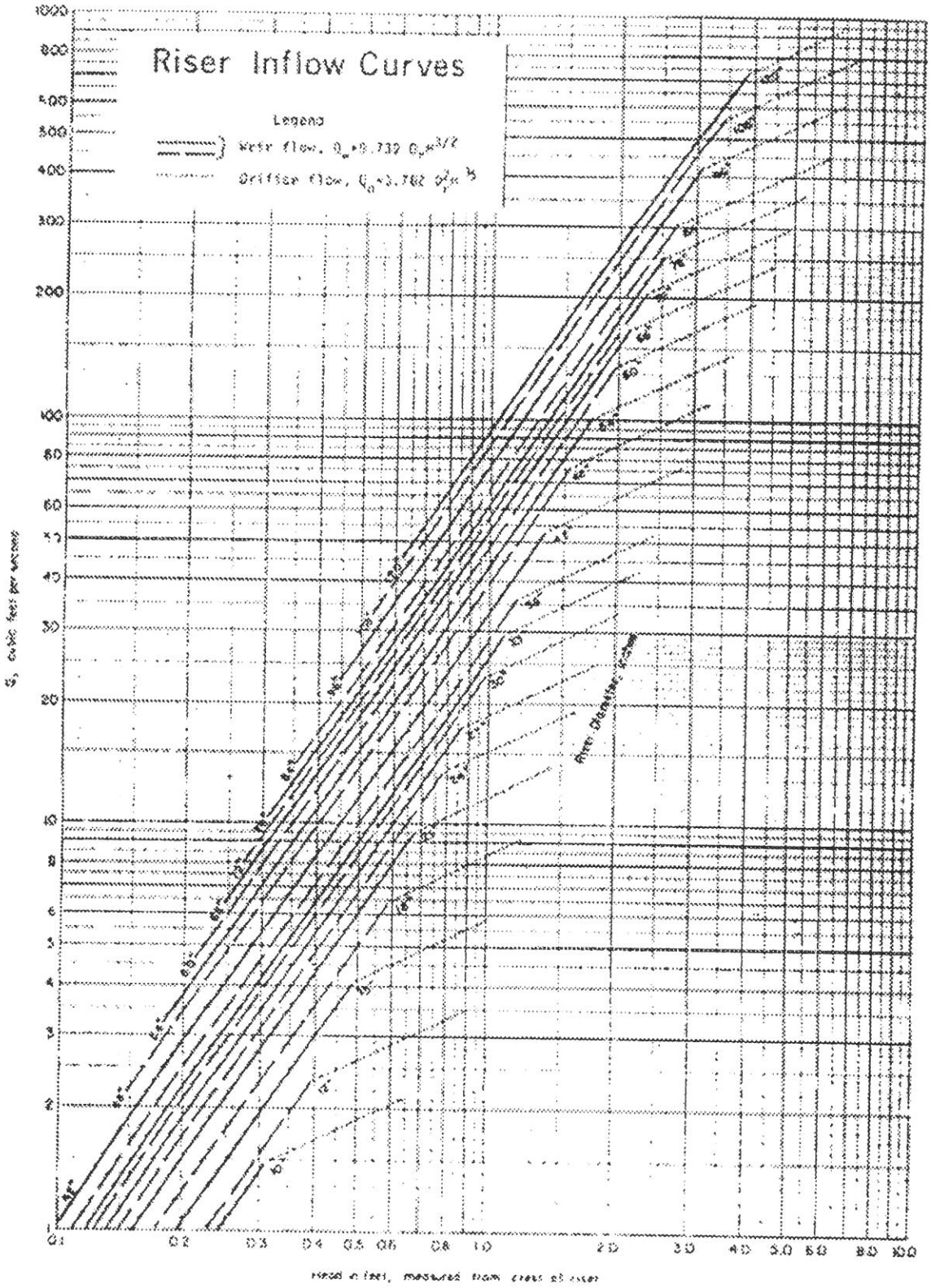


Figure 5A.26
Pipe Flow Chart; "n" = 0.025 (USDA - NRCS)

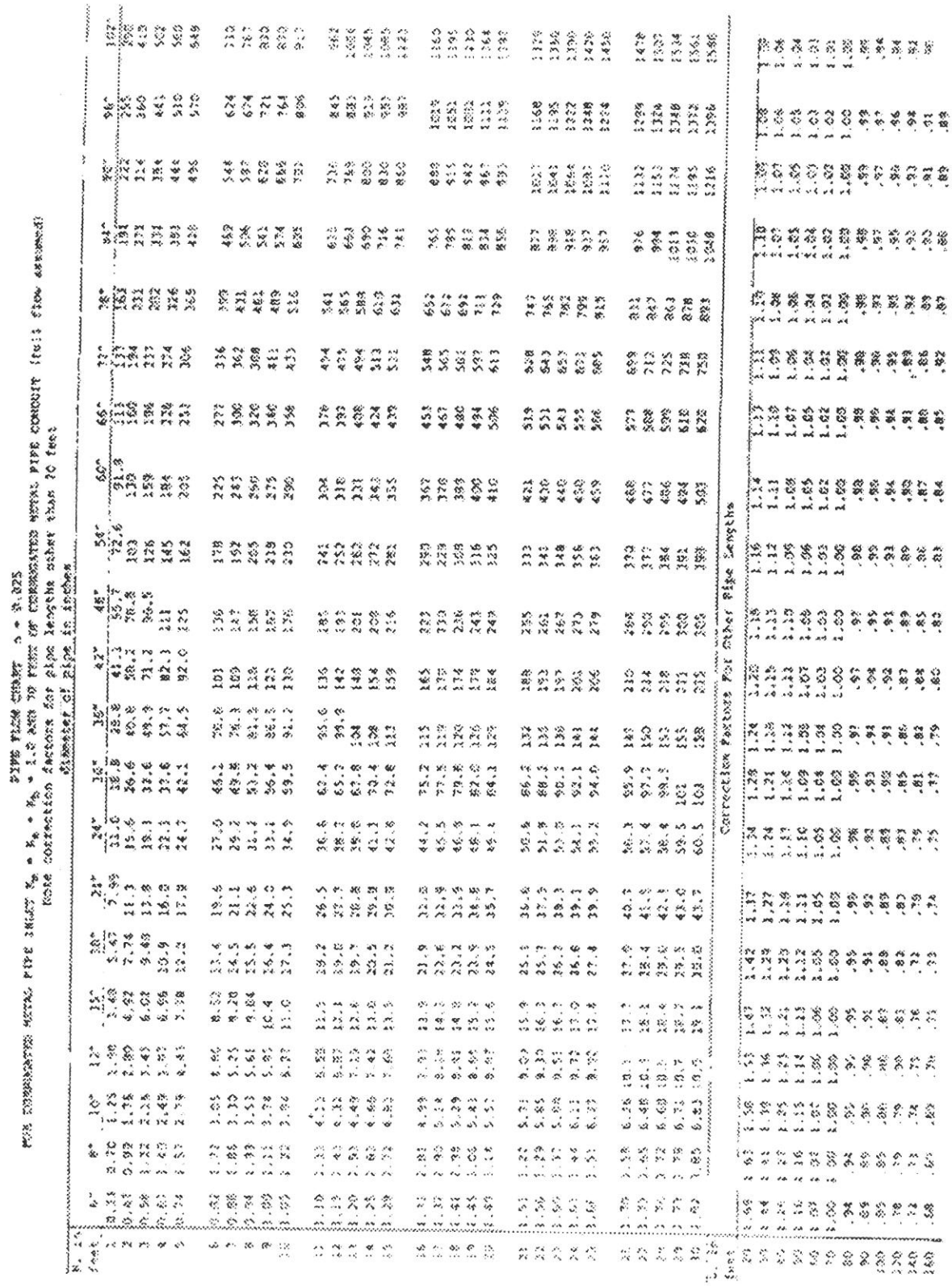


Figure 5A.27
Pipe Flow Chart; "n" = 0.013 (USDA - NRCS)

Appendix 13.6 Runoff Analysis

SPARACO ENGINEERING & LAND SURVEYING, P.C.
*CIVIL ENGINEERING * LAND SURVEYING * SITE PLANNING*
26 Firemens Memorial Drive; Pomona, N.Y. 10970
(845) 362-1966 Fax (845) 362-1987 Sparaco@hotmail.com

June 8, 2012

Orange County Trucking
P.O. Box #1351
Greenwood Lake, NY 10925

Att: Frank Lotito

Re: Chester Hill Holdings – Drainage Summary
Job #5152-9
Tax Lot # 6, Block 1, Lot# 105

Dear Mr. Lotito:

This project is located along the South side of the Lehigh & Hudson River Railroad and is bounded to the North and East by Black Meadow Road in the Town of Chester, NY.

We have prepared a site plan for your proposed mining operation at the subject site. This report will address approximately 10.36 acres of runoff draining to a new parking lot and driveway located along the North and East portion of the project. The parking lot will be gravel and will drain to a proposed Extended Detention Wetland Pond (NYSDEC Type W-2) directly to the North of the parking lot.

Drainage will discharge from this pond to a 24-inch pipe, which will drain to a stone lined swale along the new 24' wide road. The swale and road drainage will collect another 1.56 acres of runoff and will ultimately drain to a proposed 24-inch diameter crossing to an existing 24-inch HDPE (Study Point #1).

The wet pond has been sized to provide adequate detention storage for stormwater attenuation of peak discharges for storms ranging from the 2-year to the 100-year discharge.

The wet pond will be controlled by 1.8-inch, 3.9-inch and 8-inch orifi in conjunction with a 3-foot wide service spillway for control and attenuation of stormwater discharges.

Our analysis includes storms ranging from the 2-year to the 100-year design. Refer to the Summary Table below for a comparison of Existing and Developed Conditions Discharges from the site.

<u>Summary Table # 1</u> – Chester Hill Combined Peak Discharges offsite to an existing 24-inch diameter storm drainage culvert (Pt. #1) just West and South of Black Meadow Road for Existing and Developed Conditions:

	Storm Frequency (in years)				
Conditions	**2**	**5**	**10**	**25**	**100**
Pre-Development Discharges (cfs)	7.9	14.3	21.4	28.8	40.2
Post-Development Discharges (cfs)	1.8	6.7	15.2	25.6	39.7
Net Change:	- 6.1	- 7.6	- 6.2	-3.2	- 0.5

Attached are Site Plan Maps prepared by William D. Youngblood, L.S., last revised 6-8-12, drainage calculations and backup Hec-1 output data in support of our analysis.

Very truly yours,

STATE OF NEW YORK
STEVEN MICHAEL SPARACO
079513
LICENSED PROFESSIONAL ENGINEER

SPARACO ENGINEERING AND LAND SURVEYING, P.C.
Steve Sparaco, P.E.

TABLE OF CONTENTS:

Appendix:

1.) *Elevation vs. Discharge Calculations for Outlet Structure*
2.) *Orange County Soils Information*
3.) *Curve Number Calculations*
4.) *Time of Concentration Calculations*
5.) *Figure 3-1: Average Velocity Chart*

Hec-1 Analyses:

1.) *Existing Conditions Hec-1 Model*
2.) *Developed Conditions Hec-1 Model*

SPARACO ENGINEERING AND LAND SURVEYING, P.C.

Project: **Chester Hills**
Location: **Town of Chester, NY**
JOB # 5152-9

By: SMS
Date: 7-Jun-12
Sub-Area: SITE-1

Outlet Structure - Elevation vs. Discharge Calculations

Known Data:

Orifice #1:
Orifice Dia.: 1.80 in.
Invert El.: 491.00 ft.
Centerline El.: 491.08 ft.
A= 0.018 ft^2

Orifice #2:
Orifice Dia.: 3.90 in.
Invert El.: 492.80 ft.
Centerline El.: 492.96 ft.
A= 0.083 ft^2

Orifice #3:
Orifice Dia.: 8.00 in.
Invert El.: 493.30 ft.
Centerline El.: 493.63 ft.
A= 0.349 ft^2

Orifice #4:
Orifice Dia.: 0.00 in.
Invert El.: 493.30 ft.
Centerline El.: 493.30 ft.
A= 0.000 ft^2

Spillway #1 (Weir):
Spillway Inv. Elev.: 494.1 ft.
Spillway Top Elev.: n/a ft.
Spillway Length: 3.0 ft.

Spillway #2 (Top Struct.):
Spillway Inv. Elev.: 496.3 ft.
Spillway Top Elev.: n/a ft.
Spillway Length: 12.0 ft.

In Orifice Flow Eq. ;
Q=cA[sq. rt. (2gH)]

c= 0.61 (orifice #1)
c= 0.61 (orifice #2)
c= 0.61 (orifice #3)
c= 0.61 (orifice #4)
c= 0.61 (orifice #5)
c= 0.61 (orifice #6)
c= 0.61 (orifice #7)
c= 0.61 (orifice #8)
c= 0.61 (orifice #9)
g= 32.2
H= (See Below)

In Weir Flow Eq. ;
Q=cLH**3/2

c= 3.0
use L= 3.0 > than el. 494.10 ft.
H_4= (See Below)

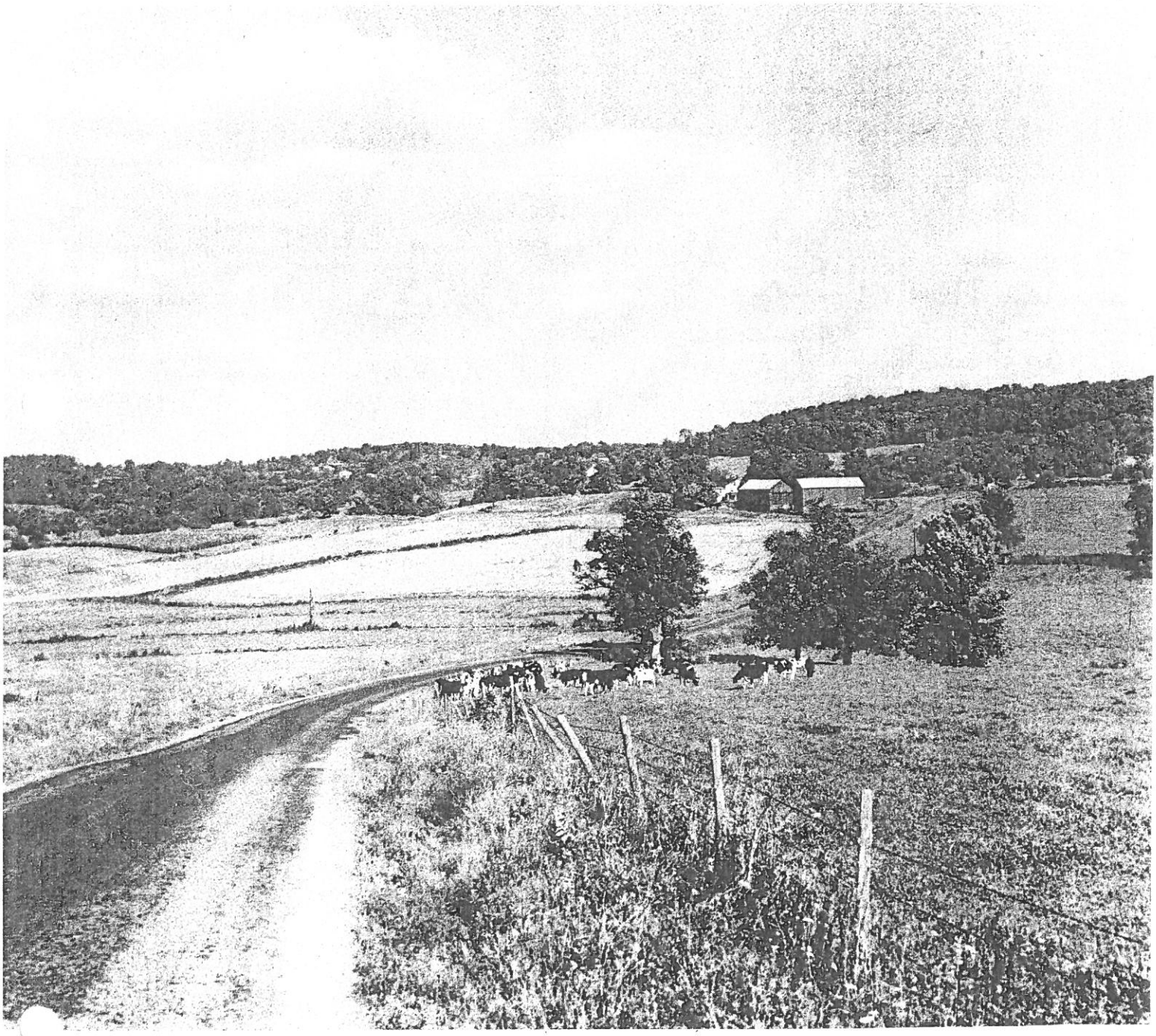
H_1= Height over orifice centerline
H_2= Height over orifice #2 centerline
H_3= Height over orifice #3 centerline
H_4= Height over orifice #4 centerline
H_{10}= Height over spillway #1 elevation
H_{11}= Height over spillway #2 elevation

** c=0.61 for square-edged orifice*
*** c=0.98 for orifice with well-rounded entry*
(Oct., 1959 Seelye Data Book for Civil Engineers)

Elevation vs. Discharge

	Orifice Flows to Orifice #1		*Orifice Flows to Orifice #2*		*Orifice Flows to Orifice #3*		*Orifice Flows to Orifice #4*		*Weir Flows over Spillway #1*		*Weir Flows over Spillway #2*		**Totals**
Elev. (ft.)	H_1 (ft.)	Flow (cfs)	H_2 (ft.)	Flow (cfs)	H_3 (ft.)	Flow (cfs)	H_4 (ft.)	Flow (cfs)	H_{10} (ft.)	Flow (cfs)	H_{11} (ft.)	Flow (cfs)	Cumulative Flow (cfs)
491.00	0.0	0.00											**0.00**
491.20	0.1	0.03											0.03
491.40	0.3	0.05											0.05
491.60	0.5	0.06											0.06
491.80	0.7	0.07											0.07
492.00	0.9	0.08											0.08
492.20	1.1	0.09											0.09
492.40	1.3	0.10											0.10
492.60	1.5	0.11											0.11
492.80	1.7	0.11											**0.11**
493.00	1.9	0.12	0.0	0.08									**0.20**
493.20	2.1	0.13	0.2	0.20									0.32
493.40	2.3	0.13	0.4	0.27									0.40
493.60	2.5	0.14	0.6	0.32									**0.46**
493.80	2.7	0.14	0.8	0.37	0.2	0.70							**1.21**
494.00	2.9	0.15	1.0	0.41	0.4	1.03							**1.60**
494.20	3.1	0.15	1.2	0.45	0.6	1.29			0.1	0.28			**2.18**
494.40	3.3	0.16	1.4	0.49	0.8	1.50			0.3	1.48			3.62
494.60	3.5	0.16	1.6	0.52	1.0	1.68			0.5	3.18			5.54
494.80	3.7	0.17	1.8	0.55	1.2	1.85			0.7	5.27			7.83
495.00	3.9	0.17	2.0	0.58	1.4	2.00			0.9	7.68			10.43
495.20	4.1	0.18	2.2	0.61	1.6	2.14			1.1	10.38			**13.31**
495.40	4.3	0.18	2.4	0.63	1.8	2.27			1.3	13.34			**16.43**
495.60	4.5	0.18	2.6	0.66	2.0	2.40			1.5	16.53			19.77
495.80	4.7	0.19	2.8	0.68	2.2	2.52			1.7	19.95			23.34
496.00	4.9	0.19	3.0	0.71	2.4	2.63			1.9	23.57			27.10
496.20	5.1	0.20	3.2	0.73	2.6	2.74			2.1	27.39			31.05
496.40	5.3	0.20	3.4	0.75	2.8	2.84			2.3	31.39	0.1	1.14	**36.33**
496.60	5.5	0.20	3.6	0.77	3.0	2.94			2.5	35.58	0.3	5.92	45.41
496.80	5.7	0.21	3.8	0.80	3.2	3.04			2.7	39.93	0.5	12.73	56.70
497.00	5.9	0.21	4.0	0.82	3.4	3.14			2.9	44.45	0.7	21.08	69.69
497.20	6.1	0.21	4.2	0.84	3.6	3.23			3.1	49.12	0.9	30.74	84.14
497.40	6.3	0.22	4.4	0.86	3.8	3.32			3.3	53.95	1.1	41.53	99.87
497.60	6.5	0.22	4.6	0.87	4.0	3.40			3.5	58.93	1.3	53.36	116.79
497.80	6.7	0.22	4.8	0.89	4.2	3.49			3.7	64.05	1.5	66.14	134.80
498.00	6.9	0.23	5.0	0.91	4.4	3.57			3.9	69.32	1.7	79.80	153.82
498.20	7.1	0.23	5.2	0.93	4.6	3.65			4.1	74.72	1.9	94.28	173.81
498.40	7.3	0.23	5.4	0.95	4.8	3.73			4.3	80.25	2.1	109.55	194.72
498.60	7.5	0.24	5.6	0.96	5.0	3.81			4.5	85.91	2.3	125.57	216.50
498.80	7.7	0.24	5.8	0.98	5.2	3.88			4.7	91.70	2.5	142.30	239.11
499.00	7.9	0.24	6.0	1.00	5.4	3.96			4.9	97.62	2.7	159.72	262.54

Soil Survey of Orange County, New York



United States Department of Agriculture, Soil Conservation Service
In cooperation with Cornell University Agricultural Experiment Station

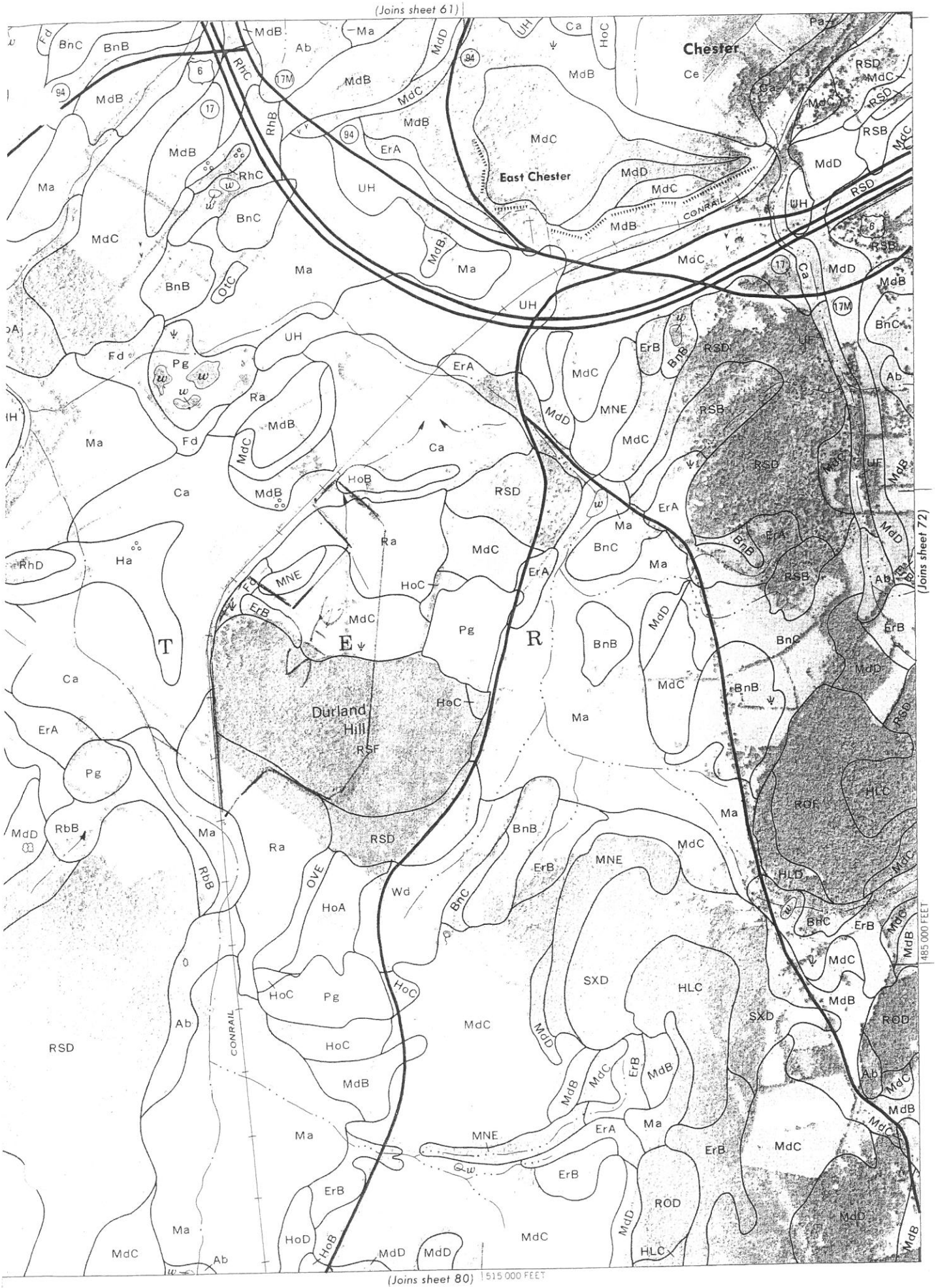

(Joins sheet 61)
Chester
East Chester
Durland Hill
RSF
CONRAIL
(Joins sheet 72)
(Joins sheet 80)
515 000 FEET
485 000 FEET
N
1 Mile
5 000 Feet
Scale 1:15 840
0
1/4
1/2
3/4
1
1 000
2 000
3 000
4 000
5 000

TABLE 17.--SOIL AND W. . FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
PtB, PtC, PtD----- Pittsfield	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Low------	Low.
Qu*. Quarries												
Ra---------- Raynham	C	None--------	---	---	0.5-2.0	Apparent	Nov-Jun	>60	---	High-----	High-----	Moderate.
RbA, RbB---------- Rhinebeck	D	None--------	---	---	0.5-1.5	Perched	Jan-May	>60	---	Moderate	High-----	Low.
RhA, RhB, RhC, RhD---------- Riverhead	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Low------	High.
RKC*, RKD*, RKF*: Rock outcrop.												
Arnot----------	C/D	None--------	---	---	1.0-1.5	Perched	Apr-May	10-20	Hard	Moderate	Low------	High.
RMC*, RMD*: Rock outcrop.												
Farmington-------	C	None--------	---	---	>6.0	---	---	10-20	Hard	Moderate	Low------	Moderate.
ROC*, ROD*, ROF*: Rock outcrop.												
Hollis----------	C/D	None--------	---	---	>6.0	---	---	10-20	Hard	Moderate	Low------	High.
RSB*, RSD*, RSF*: Rock outcrop.												
Nassau----------	C	None--------	---	---	>6.0	---	---	10-20	Hard	Moderate	Low------	High.
Sb---------- Scarboro	D	Rare--------	---	---	0-1.0	Apparent	Jan-Dec	>60	---	Moderate	High-----	High.
ScA---------- Scio	B	None to rare	---	---	1.5-2.0	Apparent	Mar-May	>60	---	High-----	Moderate	Moderate.
ScB---------- Scio	B	None--------	---	---	1.5-2.0	Apparent	Mar-May	>60	---	High-----	Moderate	Moderate.
Su---------- Suncook	A	Common------	Brief-----	Mar-May	3.0-6.0	Apparent	Jan-Apr	>60	---	Low------	Low------	High.
SwB, SwC, SwD----- Swartswood	C	None--------	---	---	2.0-4.0	Perched	Nov-Mar	>60	---	Moderate	Low------	High.
SXC*, SXD*, SXF*: Swartswood-------	C	None--------	---	---	2.0-4.0	Perched	Nov-Mar	>60	---	Moderate	Low------	High.

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
ESB*---------- Erie	C	None--------	---	---	0.5-1.5	Perched	Dec-May	>60	---	High-----	---	Low.
FAC---------- Farmington	C	None--------	---	---	>6.0	---	---	10-20	Hard	Moderate	Low------	Moderate.
Fd---------- Fredon	C	None--------	---	---	0-1.5	Apparent	Oct-Jun	>60	---	High-----	Low------	Low.
Ha---------- Halsey	D	None to rare	---	---	0-0.5	Apparent	Sep-Jun	>60	---	High-----	High-----	Low.
HH*. Histic Humaquepts												
HLC*, HLD*-------- Hollis	C/D	None--------	---	---	>6.0	---	---	10-20	Hard	Moderate	Low------	High.
HoA, HoB, HoC, HoD---------- Hoosic	A	None--------	---	---	>6.0	---	---	>60	---	Low------	Low------	High.
LdB, LdC---------- Lordstown	C	None--------	---	---	>6.0	---	---	20-40	Hard	Moderate	Low------	High.
Ma---------- Madalin	D	None--------	---	---	0-0.5	Apparent	Dec-May	>60	---	Moderate	High-----	Low.
MdB, MdC, MdD, MNE*---------- Mardin	C	None--------	---	---	1.5-2.0	Perched	Mar-May	>60	---	Moderate	Moderate	Low.
My---------- Middlebury	B	Common------	Brief-----	Nov-May	0.5-2.0	Apparent	Feb-Apr	>60	---	High-----	Moderate	Low.
NaD---------- Nassau	C	None--------	---	---	>6.0	---	---	10-20	Hard	Moderate	Low------	High.
OkA, OkB---------- Oakville	A	None--------	---	---	>3.0	Apparent	Nov-Apr	>60	---	Low------	Low------	Moderate.
OtB, OtC, OtD----- Otisville	A	None--------	---	---	>6.0	---	---	>60	---	Low------	Low------	High.
OVE*: Otisville--------	A	None--------	---	---	>6.0	---	---	>60	---	Low------	Low------	High.
Hoosic----------	A	None--------	---	---	>6.0	---	---	>60	---	Low------	Low------	High.
Pa, Pb---------- Palms	A/D	Frequent----	Long------	Nov-May	0-1.0	Apparent	Nov-May	>60	---	High-----	High-----	Moderate.
Pg*. Pits												

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES

[For definitions of "flooding" and "water table" in the Glossary explain terms such as "rare," "brief," "apparent," and "perched." The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
Ab, AC*---------- Alden	D	None---------	---	---	0-0.5	Perched	Nov-Jun	>60	---	High-----	High-----	Low.
AdA, AdB---------- Allard	B	None---------	---	---	>6.0	---	---	>60	---	High-----	Low------	Moderate.
ANC*, AND*, ANF*: Arnot----------	C/D	None---------	---	---	1.0-1.5	Perched	Apr-May	10-20	Hard	Moderate	Low------	High.
Lordstown--------	C	None---------	---	---	>6.0	---	---	20-40	Hard	Moderate	Low------	High.
Ba---------- Barbour	B	Occasional	Brief to long.	Dec-Apr	3.0-6.0	Apparent	Jan-Apr	>60	---	Moderate	Low------	Moderate.
Be---------- Basher	B	Occasional	Brief to long.	Dec-Apr	1.5-2.0	Apparent	Jan-May	>60	---	High-----	Moderate	Moderate.
BnB*, BnC*: Bath----------	C	None---------	---	---	2.0-4.0	Perched	Nov-Mar	48-60	Hard	Moderate	Moderate	Moderate.
Nassau----------	C	None---------	---	---	>6.0	---	---	10-20	Hard	Moderate	Low------	High.
Ca---------- Canandaigua	D	None to rare	---	---	0-0.5	Apparent	Nov-Jun	>60	---	High-----	High-----	Low.
Cd, Ce, Cf-------- Carlisle	A/D	Frequent----	Long------	Nov-May	0-1.0	Apparent	Sep-Jun	>60	---	High-----	High-----	Low.
CgA, CgB---------- Castile	B	None---------	---	---	1.5-2.0	Apparent	Mar-May	>60	---	High-----	Moderate	Moderate.
ChB, ChC---------- Charlton	B	None---------	---	---	>6.0	---	---	>60	---	Low------	Low------	High.
CLC*, CLD*: Charlton---------	B	None---------	---	---	>6.0	---	---	>60	---	Low------	Low------	High.
Paxton----------	C	None---------	---	---	>6.0	---	---	>60	---	Moderate	Low------	Moderate.
CnA, CnB, CnC----- Chenango	A	None---------	---	---	>6.0	---	---	>60	---	Moderate	Low------	Moderate.
CoB, CoC, CoD----- Collamer	C	None---------	---	---	1.5-2.0	Apparent	Mar-May	>60	---	High-----	Moderate	Low.
Du*. Dumps												
ErA, ErB---------- Erie	C	None---------	---	---	0.5-1.5	Perched	Dec-May	>60	---	High-----	High-----	Low.

See footnote at end of table.

SPARACO ENGINEERING AND LAND SURVEYING, P.C.
P.O. Box #818
Harriman, NY 10926
845-782-8543

Worksheet 2: Runoff Curve Number and Runoff

Project: **O-3425** By: JS Date: **1-Jun-12**

Location: **Town of Chester, NY** Checked: Date:

Shade one: Existing Developed CN for Sub-basin: *Site-1*

1. **Runoff Curve Number (CN)**

Soil name and hydrologic group (appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected / connected impervious area ratio)	CN Table 2-2	CN Figure 2.3	CN Figure 2.4	Area ■ acres ☐ mi^2 ☐ %	Product of CN X AREA
C	Woods - Good Condition	70			1.82	127.4
C	Lawn / Open Space - Good Condition	74			10.1	747.4
	Impervious Surfaces	98			0.00	0
				Totals =	11.92	874.8

CN (weighted) = total product 874.8 = 73.38926174
total area 11.92

Use CN = 73

Runoff

Storm # 1	Storm # 2	Storm # 3

Frequency. . . . . yr.
Rainfall, P (24 - hour) . . . . . in.
Runoff, Q . . . . . in.

(Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.)

SPARACO ENGINEERING AND LAND SURVEYING, P.C.
P.O. Box #818
Harriman, NY 10926
845-782-8543

Worksheet 2: Runoff Curve Number and Runoff

Project: **O-3425** By: JS Date: **1-Jun-12**

Location: **Town of Chester, N.Y.** Checked: Date:

Shade one: Existing Developed CN for Sub-basin: *Site-1*

1. **Runoff Curve Number (CN)**

Soil name and hydrologic group (appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected / connected impervious area ratio)	CN Table 2-2	CN Figure 2.3	CN Figure 2.4	Area ■ acres □ mi^2 □ %	Product of CN X AREA
C	Woods - Good Condition	70			0.52	36.4
C	Lawn / Open Space - Good Condition	74			7.92	586.08
C	Gravel Areas - Developed Mining Area	89			1.3	115.7
	Impervious Surfaces	98			0.62	60.76
				Totals =	10.36	798.94

CN (weighted) = total product / total area = 798.94 / 10.36 = 77.11776062

Use CN = 77

Runoff

Storm # 1	Storm # 2	Storm # 3

Frequency. . . . . yr.
Rainfall, P (24 - hour) . . . . . in.
Runoff, Q . . . . . in.

(Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.)

SPARACO ENGINEERING AND LAND SURVEYING, P.C.
P.O. Box #818
Harriman, NY 10926
845-782-8543

Worksheet 2: Runoff Curve Number and Runoff

Project: O-3425 By: JS Date: 1-Jun-12

Location: Town of Chester, N.Y. Checked: Date:

Shade one: Existing Developed CN for Sub-basin: *Site-2*

1. **Runoff Curve Number (CN)**

Soil name and hydrologic group (appendix A)	Cover Description (cover type, treatment, and hydrologic condition; percent impervious; unconnected / connected impervious area ratio)	CN Table 2-2	CN Figure 2.3	CN Figure 2.4	Area ■ acres □ mi² □ %	Product of CN X AREA
C	Woods - Good Condition	70			0	0
C	Lawn / Open Space - Good Condition	74			1.12	82.88
	Impervious Surfaces	98			0.44	43.12
				Totals =	1.56	126

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{126}{1.56} = 80.76923077$

Use CN = **81**

Runoff

Storm # 1	Storm # 2	Storm # 3

Frequency. . . . . yr.
Rainfall, P (24 - hour) . . . . . in.
Runoff, Q . . . . . in.

(Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.)

SPARACO ENGINEERING AND LAND SURVEYING, P.C.
P.O. Box #818
Harriman, NY 10926
845-782-8543

Worksheet 3: Time of Concentration (Tc) Calculations

PROJECT: Chester Hill Holdings JOB #: o-3425 BY: JS
LOCATION: Town of Chester DATE: 5/25/12

Mark One: Existing Developed

To Design Point: 1
Time of Concentration thru Sub-Area: Site-1

Notes: Space for as many as two segments per flow type can be used for each worksheet.
Include a map, schematic or description of flow segments.

Sheet Flow:	Segment ID:	715.1-710			
1. Surface description (table 3-1).....		woods			
2. Manning's Roughness Coeff., n (table 3-1).....		0.8			
3. Flow Length, L (total < or = to 300 ft.).....(ft.)		60			
4. Two year, 24 hr rainfall, P_2.....(in.)		3.3			
5. Land Slope, S.....(ft./ft.)		0.085			
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ S^{0.4}}$	Compute T_t = ...(hr.)	0.23		=	0.23 (hrs.)

Shallow Concentrated Flow:	Segment ID:	710-520			
1. Surface description (paved or unpaved).....		unpaved			
2. Flow Length, L ..... (ft.)		1145			
3. Watercourse Slope, s.....(ft./ft.)		0.166			
4. Average Velocity, V (figure 3-1)..... (ft./s)		6.5			
6. $T_t = \frac{L}{3600\ V}$	Compute T_t = ...(hr.)	0.05		=	0.05 (hrs.)

Open Channel Flow (California Method):

	(ft.)	(mi.)	
Flow Length, L:	*1427*	*0.270*	
	(Start)	(End)	(Change in ft.)
Elevation Change:	*520.0*	*483.6*	*36.4*

$T_t = (11.9L^3/H)^{0.385}$

T_t = **0.14**

= 0.14 (hrs.)

Total Tc = 0.42 (hrs.)
25.3 (min.)

SPARACO ENGINEERING AND LAND SURVEYING, P.C.
P.O. Box #818
Harriman, NY 10926
845-782-8543

Worksheet 3: Time of Concentration (Tc) Calculations

PROJECT: Chester Hill Holdings JOB #: o-3425 BY: JS
LOCATION: Town of Chester DATE: 5/25/12

Mark One: Existing Developed

To Design Point: 1
Time of Concentration thru Sub-Area: SITE-1

Notes: Space for as many as two segments per flow type can be used for each worksheet.
Include a map, schematic or description of flow segments.

Sheet Flow:	Segment ID:	715.1-710			
1. Surface description (table 3-1).....		light woods			
2. Manning's Roughness Coeff., n (table 3-1).....		0.4			
3. Flow Length, L (total < or = to 300 ft.).....(ft.)		60			
4. Two year, 24 hr rainfall, P_2.....(in.)		3.3			
5. Land Slope, S.....(ft./ft.)		0.085			
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ S^{0.4}}$ Compute T_t = ...(hr.)		0.13		=	**0.13** (hrs.)

Shallow Concentrated Flow:	Segment ID:	710-520			
1. Surface description (paved or unpaved).....		unpaved			
2. Flow Length, L ..... (ft.)		1145			
3. Watercourse Slope, s.....(ft./ft.)		0.166			
4. Average Velocity, V (figure 3-1)..... (ft./s)		6.5			
6. $T_t = \frac{L}{3600\ V}$ Compute T_t = ...(hr.)		0.05		=	**0.05** (hrs.)

Open Channel Flow (California Method):

	(ft.)	(mi.)			
Flow Length, L:	*650*	*0.123*			
	(Start)	(End)	(Change in ft.)		
Elevation Change:	*520.0*	*491.0*	*29.0*		
$T_t = (11.9L^3/H)^{0.385}$					
T_t =	**0.06**			=	**0.06** (hrs.)

Total Tc = **0.24** (hrs.)
14.6 (min.)

SPARACO ENGINEERING AND LAND SURVEYING, P.C.
P.O. Box #818
Harriman, NY 10926
845-782-8543

Worksheet 3: Time of Concentration (Tc) Calculations

PROJECT: Chester Hill Holdings JOB #: o-3425 BY: JS
LOCATION: Town of Chester DATE: 5/25/12

Mark One: Existing Developed

To Design Point: 1
Time of Concentration thru Sub-Area: SITE-2

Notes: Space for as many as two segments per flow type can be used for each worksheet.
Include a map, schematic or description of flow segments.

Sheet Flow:	Segment ID:	497-494				
1. Surface description (table 3-1).....		grass				
2. Manning's Roughness Coeff., n (table 3-1).....		0.15				
3. Flow Length, L (total < or = to 300 ft.).....(ft.)		65				
4. Two year, 24 hr rainfall, P_2.....(in.)		3.3				
5. Land Slope, S.....(ft./ft.)		0.046				
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ S^{0.4}}$ Compute T_t = ...(hr.)		0.08		=	0.08	(hrs.)

Shallow Concentrated Flow:	Segment ID:	494-486.5				
1. Surface description (paved or unpaved).....		unpaved				
2. Flow Length, L ..... (ft.)		480				
3. Watercourse Slope, s.....(ft./ft.)		0.016				
4. Average Velocity, V (figure 3-1)..... (ft./s)		2				
6. $T_t = \frac{L}{3600\ V}$ Compute T_t = ...(hr.)		0.07		=	0.07	(hrs.)

Open Channel Flow (California Method):

	(ft.)	(mi.)	
Flow Length, L:	*365*	*0.069*	
	(Start)	(End)	(Change in ft.)
Elevation Change:	*486.5*	*483.6*	*2.9*

$T_t = (11.9L^3/H)^{0.385}$

T_t = **0.08**

= 0.08 (hrs.)

Total Tc = 0.23 (hrs.)
13.6 (min.)

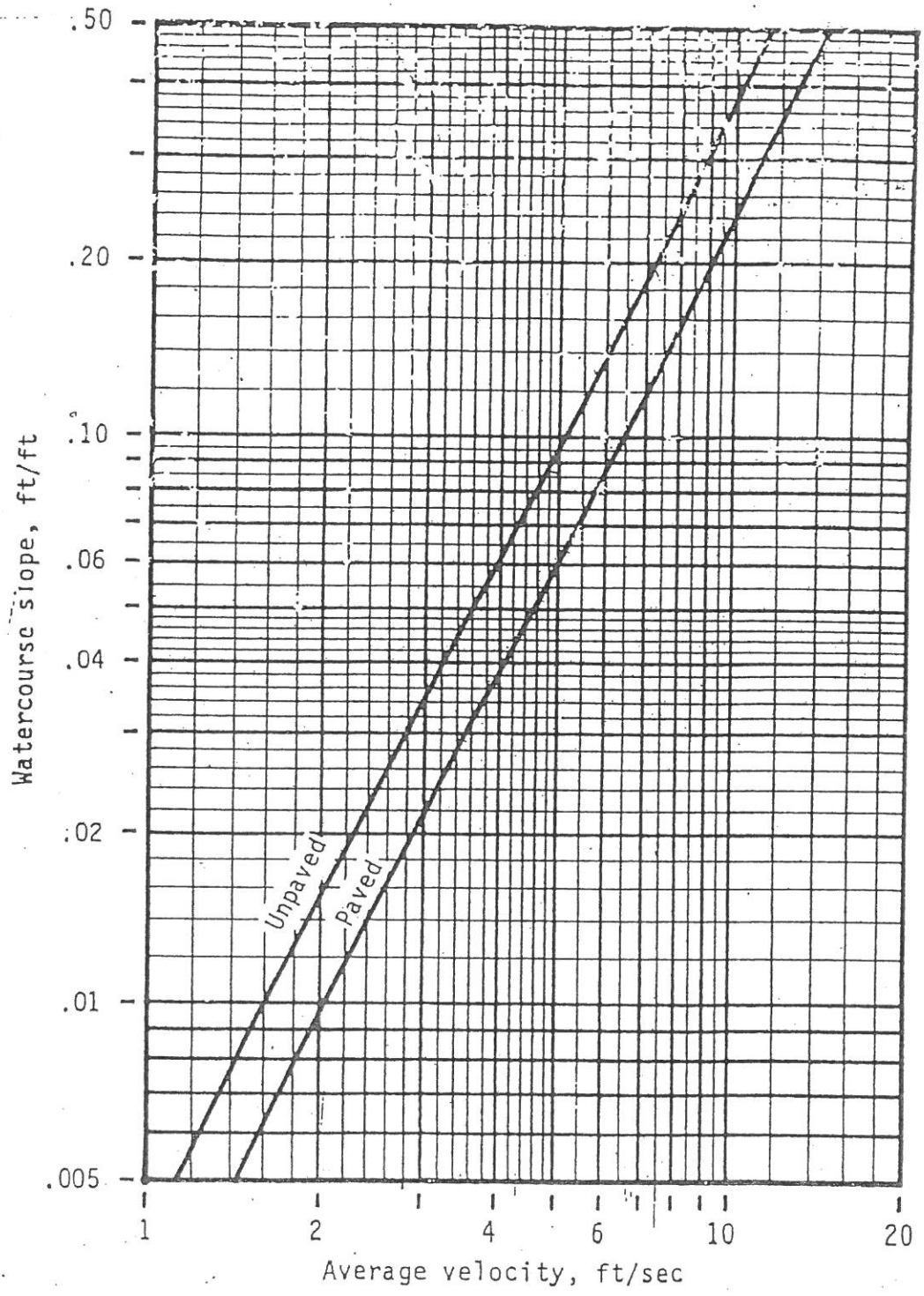


Figure 3-1.—Average velocities for estimating travel time for shallow concentrated flow.

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             MAY   1991                *
*           VERSION 4.0.1U              *
*     Lahey F77L-EM/32 version 5.01     *
*       Dodson & Associates, Inc.       *
*  RUN DATE  06/07/12  TIME  12:58:00   *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
*****************************************
```

CHESTER HILLS #5152-9: EXISTING CONDITIONS HEC-1 ANALYSIS

```
X     X  XXXXXXX   XXXXX           X
X     X  X         X     X        XX
X     X  X         X              X
XXXXXXX  XXXX      X        XXXXX  X
X     X  X         X              X
X     X  X         X     X        X
X     X  XXXXXXX    XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

   1          ID                    ------------input file:ex.ih1-------------
   2          ID
   3          ID       HYDROLOGY FOR: CHESTER HILLS #5152-9
   4          ID                      TOWN OF CHESTER, NY
   5          ID                      DATE: 6/5/12 -SMS
   6          ID
   7          ID       ANALYSIS PREPARED BY: SPARACO ENGINEERING AND LAND SURVEYING, P.C.
   8          ID
   9          ID  ANALYSIS PARAMETERS:
  10          ID  EXISTING CONDITIONS RUN
  11          ID  STORM RECURRENCE INTERVALS = 1, 2, 5, 10, 25 & 100 YEAR
  12          ID  HYDROGRAPH METHOD:           SCS
  13          ID  RAINFALL DISTRIBUTION:       SCS TYPE III
  14          ID
  15          ID  24 HOUR RAINFALL DATA:
  16          ID  1 YEAR: 2.9 INCHES
  17          ID  2 YEAR: 3.5 INCHES
  18          ID  5 YEAR: 4.5 INCHES
  19          ID  10 YEAR: 5.5 INCHES
  20          ID  25 YEAR: 6.5 INCHES
  21          ID  100 YEAR: 8.0 INCHES
  22          ID
  23          ID
              *DIAGRAM
  24          IT       6       0       0     300
  25          IO       3       0
  26          JR    PREC     2.9     3.5     4.5     5.5     6.5       8

  27          KK  SITE-1DEV. SITE RUNOFF TOWARD PT.1
  28          KM
  29          KM  ************************************************************************
  30          KM  * DRAINAGE AREA = 11.92 AC = 0.0186 SQ. MI.      CN=73                  *
  31          KM  * TIME OF CONCENTRATION = 25.3  MIN = 0.42 HR x 0.6 (SCS LAG) = 0.253 *
  32          KM  ************************************************************************
  33          KM
  34          BA  0.0186
  35          PB       1
  36          IN       6
  37          PC       0   0.001   0.002   0.003   0.004   0.005   0.006   0.007   0.008   0.009
  38          PC   0.010   0.011   0.012   0.013   0.014   0.015   0.016   0.017   0.018   0.019
  39          PC   0.020   0.021   0.022   0.023   0.024   0.026   0.027   0.028   0.029   0.030
  40          PC  0.0305   0.031   0.032   0.034   0.035   0.036   0.037   0.038   0.040   0.041
  41          PC   0.042   0.043   0.045   0.046   0.047   0.049   0.050   0.051   0.053   0.054
  42          PC   0.055   0.057   0.058   0.060   0.061   0.063   0.064   0.066   0.067   0.069
  43          PC   0.070   0.072   0.074   0.075   0.077   0.079   0.080   0.082   0.084   0.085
  44          PC   0.087   0.089   0.091   0.093   0.095   0.097   0.100   0.103   0.106   0.109
  45          PC   0.112   0.115   0.118   0.121   0.124   0.127   0.130   0.134   0.137   0.140
  46          PC   0.144   0.148   0.151   0.155   0.159   0.163   0.167   0.171   0.176   0.180
  47          PC   0.185   0.189   0.194   0.199   0.205   0.210   0.216   0.222   0.228   0.235
  48          PC   0.242   0.250   0.258   0.266   0.276   0.287   0.298   0.312   0.328   0.363
  49          PC   0.416   0.500   0.584   0.638   0.673   0.689   0.702   0.714   0.725   0.734
  50          PC   0.743   0.751   0.758   0.766   0.772   0.779   0.785   0.790   0.796   0.801
  51          PC   0.806   0.811   0.816   0.821   0.825   0.829   0.834   0.838   0.842   0.845
  52          PC   0.849   0.853   0.857   0.860   0.864   0.867   0.870   0.874   0.877   0.880
  53          PC   0.886   0.889   0.892   0.895   0.898   0.900   0.903   0.906   0.908   0.910
```

```
          LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

            54          PC   0.911   0.913   0.915   0.917   0.919   0.920   0.922   0.924   0.925   0.927
            55          PC   0.929   0.930   0.932   0.933   0.935   0.936   0.938   0.939   0.941   0.942
            56          PC   0.944   0.945   0.946   0.948   0.949   0.951   0.952   0.953   0.955   0.956
            57          PC   0.957   0.958   0.960   0.961   0.962   0.963   0.965   0.966   0.967   0.968
            58          PC   0.969   0.971   0.972   0.973   0.974   0.975   0.976   0.977   0.978   0.979
            59          PC   0.981   0.982   0.983   0.984   0.985   0.986   0.987   0.988   0.989   0.990
            60          PC   0.991   0.992   0.993   0.994   0.995   0.996   0.997   0.998   0.999   1.000
            61          LS       1      73
            62          UD   0.253
            63          ZZ
1
                SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

    27      SITE-1

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1****************************************                    ****************************************
*                                      *                    *                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                    *    U.S. ARMY CORPS OF ENGINEERS      *
*              MAY   1991              *                    *    HYDROLOGIC ENGINEERING CENTER     *
*           VERSION 4.0.1U             *                    *          609 SECOND STREET           *
*     Lahey F77L-EM/32 version 5.01    *                    *       DAVIS, CALIFORNIA 95616        *
*       Dodson & Associates, Inc.      *                    *          (916) 551-1748              *
*  RUN DATE  06/07/12  TIME  12:58:00  *                    *                                      *
****************************************                    ****************************************
```

~~~~~~~~~~~~input file:ex.ih1~~~~~~~~~~~~~

HYDROLOGY FOR: CHESTER HILLS #5152-9
TOWN OF CHESTER, NY
DATE: 6/5/12 -SMS

ANALYSIS PREPARED BY: SPARACO ENGINEERING AND LAND SURVEYING, P.C.

ANALYSIS PARAMETERS:
EXISTING CONDITIONS RUN
STORM RECURRENCE INTERVALS = 1, 2, 5, 10, 25 & 100 YEAR
HYDROGRAPH METHOD: SCS
RAINFALL DISTRIBUTION: SCS TYPE III

24 HOUR RAINFALL DATA:
1 YEAR: 2.9 INCHES
2 YEAR: 3.5 INCHES
5 YEAR: 4.5 INCHES
10 YEAR: 5.5 INCHES
25 YEAR: 6.5 INCHES
100 YEAR: 8.0 INCHES

```
  25 IO          OUTPUT CONTROL VARIABLES
                      IPRNT           3  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

     IT          HYDROGRAPH TIME DATA
                      NMIN           6  MINUTES IN COMPUTATION INTERVAL
                     IDATE      1    0  STARTING DATE
                     ITIME         0000  STARTING TIME
                        NQ          300  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE      2    0  ENDING DATE
                    NDTIME         0554  ENDING TIME
                     ICENT           19  CENTURY MARK

                   COMPUTATION INTERVAL     0.10 HOURS
                       TOTAL TIME BASE   29.90 HOURS

          ENGLISH UNITS
               DRAINAGE AREA          SQUARE MILES
               PRECIPITATION DEPTH    INCHES
               LENGTH, ELEVATION      FEET
               FLOW                   CUBIC FEET PER SECOND
               STORAGE VOLUME         ACRE-FEET
               SURFACE AREA           ACRES
               TEMPERATURE            DEGREES FAHRENHEIT

     JP          MULTI-PLAN OPTION
                      NPLAN           1  NUMBER OF PLANS

     JR          MULTI-RATIO OPTION
                     RATIOS OF PRECIPITATION
                   2.90      3.50      4.50      5.50      6.50      8.00
```
~~~~~~~~~~~~

```
*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
 27 KK    *   SITE-1   *     DEV. SITE RUNOFF TOWARD PT.1
          *            *
          **************

                    *********************************************************************
                    * DRAINAGE AREA = 11.92 AC = 0.0186 SQ. MI.         CN=73                *
                    * TIME OF CONCENTRATION = 25.3  MIN = 0.42 HR x 0.6 (SCS LAG) = 0.253 *
                    *********************************************************************


 36 IN          TIME DATA FOR INPUT TIME SERIES
                      JXMIN          6  TIME INTERVAL IN MINUTES
                     JXDATE      1   0  STARTING DATE
                     JXTIME          0  STARTING TIME

              SUBBASIN RUNOFF DATA

 34 BA          SUBBASIN CHARACTERISTICS
                      TAREA       0.02  SUBBASIN AREA

                PRECIPITATION DATA

 35 PB                STORM       1.00  BASIN TOTAL PRECIPITATION

 37 PI            INCREMENTAL PRECIPITATION PATTERN
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                     0.00      0.01      0.00      0.01      0.00      0.01      0.01      0.01      0.01      0.01
                     0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.02      0.03      0.05
                     0.08      0.08      0.05      0.03      0.02      0.01      0.01      0.01      0.01      0.01
                     0.01      0.01      0.01      0.01      0.01      0.01      0.00      0.01      0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.01
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00

 61 LS          SCS LOSS RATE
                     STRTL        1.00  INITIAL ABSTRACTION
                    CRVNBR       73.00  CURVE NUMBER
                     RTIMP        0.00  PERCENT IMPERVIOUS AREA

 62 UD          SCS DIMENSIONLESS UNITGRAPH
                      TLAG        0.25  LAG

                                                    ***

                                             UNIT HYDROGRAPH
                                         15 END-OF-PERIOD ORDINATES
                 7.        22.        30.        25.        15.         9.         5.         3.         2.         1.
                 1.         0.         0.         0.         0.

   TOTAL RAINFALL =    1.00, TOTAL LOSS =    1.00, TOTAL EXCESS =    0.00

 PEAK FLOW      TIME                       MAXIMUM AVERAGE FLOW
                                   6-HR        24-HR        72-HR      29.90-HR
+  (CFS)       (HR)
                       (CFS)
+      0.      0.10                  0.           0.           0.           0.
                     (INCHES)      0.000        0.000        0.000        0.000
                      (AC-FT)         0.           0.           0.           0.

                     CUMULATIVE AREA =     0.02 SQ MI


    ***            ***            ***            ***            ***

                      HYDROGRAPH AT STATION    SITE-1
                       FOR PLAN 1, RATIO = 2.90

   TOTAL RAINFALL =    2.90, TOTAL LOSS =    2.26, TOTAL EXCESS =    0.64

 PEAK FLOW      TIME                       MAXIMUM AVERAGE FLOW
                                   6-HR        24-HR        72-HR      29.90-HR
+  (CFS)       (HR)
```

			(CFS)			
+	5.	12.50		1.	0.	0.	0.
			(INCHES)	0.523	0.645	0.645	0.645
			(AC-FT)	1.	1.	1.	1.

CUMULATIVE AREA = 0.02 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION SITE-1
FOR PLAN 1, RATIO = 3.50

TOTAL RAINFALL = 3.50, TOTAL LOSS = 2.49, TOTAL EXCESS = 1.01

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	29.90-HR
+	(CFS)	(HR)					
			(CFS)				
+	8.	12.50		2.	1.	0.	0.
			(INCHES)	0.834	1.008	1.008	1.008
			(AC-FT)	1.	1.	1.	1.

CUMULATIVE AREA = 0.02 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION SITE-1
FOR PLAN 1, RATIO = 4.50

TOTAL RAINFALL = 4.50, TOTAL LOSS = 2.80, TOTAL EXCESS = 1.70

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	29.90-HR
+	(CFS)	(HR)					
			(CFS)				
+	14.	12.40		3.	1.	1.	1.
			(INCHES)	1.420	1.702	1.702	1.702
			(AC-FT)	1.	2.	2.	2.

CUMULATIVE AREA = 0.02 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION SITE-1
FOR PLAN 1, RATIO = 5.50

TOTAL RAINFALL = 5.50, TOTAL LOSS = 3.03, TOTAL EXCESS = 2.47

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	29.90-HR
+	(CFS)	(HR)					
			(CFS)				
+	21.	12.40		4.	1.	1.	1.
			(INCHES)	2.058	2.470	2.470	2.470
			(AC-FT)	2.	2.	2.	2.

CUMULATIVE AREA = 0.02 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION SITE-1
FOR PLAN 1, RATIO = 6.50

TOTAL RAINFALL = 6.50, TOTAL LOSS = 3.21, TOTAL EXCESS = 3.29

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	29.90-HR
+	(CFS)	(HR)					
			(CFS)				
+	29.	12.40		5.	2.	1.	1.
			(INCHES)	2.733	3.289	3.289	3.289
			(AC-FT)	3.	3.	3.	3.

CUMULATIVE AREA = 0.02 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION SITE-1
FOR PLAN 1, RATIO = 8.00

TOTAL RAINFALL = 8.00, TOTAL LOSS = 3.42, TOTAL EXCESS = 4.58

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	29.90-HR
+	(CFS)	(HR)					
			(CFS)				
+	40.	12.40		8.	2.	2.	2.
			(INCHES)	3.782	4.580	4.580	4.580
			(AC-FT)	4.	5.	5.	5.

CUMULATIVE AREA = 0.02 SQ MI

1

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
VOLUME IN ACRE-FEET, TIME TO PEAK IN HOURS

					RATIOS APPLIED TO PRECIPITATION					
OPERATION	STATION	AREA	PLAN		RATIO 1	RATIO 2	RATIO 3	RATIO 4	RATIO 5	RATIO 6
					2.90	3.50	4.50	5.50	6.50	8.00
HYDROGRAPH AT										
+	SITE-1	0.019	1	FLOW	4.58	7.86	14.28	21.38	28.79	40.24
				TIME	12.50	12.50	12.40	12.40	12.40	12.40
				VOLUME	0.64	1.00	1.69	2.45	3.26	4.54

*** NORMAL END OF HEC-1 ***

```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              MAY  1991               *
*           VERSION 4.0.1U             *
*     Lahey F77L-EM/32 version 5.01    *
*       Dodson & Associates, Inc.      *
*  RUN DATE  06/07/12  TIME  12:58:17  *
****************************************
```

```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 551-1748             *
*                                      *
****************************************
```

CHESTER HILLS #5152-9: DEVELOPED CONDITIONS HEC-1 ANALYSIS

```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X              X
X     X  X        X     X        X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

    1         ID                    ------------input file:dev-wq.ih1-------------
    2         ID
    3         ID       HYDROLOGY FOR: CHESTER HILLS #5152-9
    4         ID                      TOWN OF CHESTER, NY
    5         ID                      DATE: 6/7/12 -SMS
    6         ID
    7         ID       ANALYSIS PREPARED BY: SPARACO ENGINEERING AND LAND SURVEYING, P.C.
    8         ID
    9         ID  ANALYSIS PARAMETERS:
   10         ID  DEVELOPED CONDITIONS RUN
   11         ID  STORM RECURRENCE INTERVALS = 1, 2, 5, 10, 25 & 100 YEAR
   12         ID  HYDROGRAPH METHOD:          SCS
   13         ID  RAINFALL DISTRIBUTION:      SCS TYPE III
   14         ID
   15         ID  24 HOUR RAINFALL DATA:
   16         ID  1 YEAR: 2.9 INCHES
   17         ID  2 YEAR: 3.5 INCHES
   18         ID  5 YEAR: 4.5 INCHES
   19         ID  10 YEAR: 5.5 INCHES
   20         ID  25 YEAR: 6.5 INCHES
   21         ID  100 YEAR: 8.0 INCHES
   22         ID
   23         ID
              *DIAGRAM
   24         IT       6       0       0     300
   25         IO       3       0
   26         JR    PREC     2.9     3.5     4.5     5.5     6.5       8

   27         KK  SITE-1DEV. SITE RUNOFF TOWARD PT.1
   28         KM
   29         KM  ************************************************************************
   30         KM  * DRAINAGE AREA = 10.36 AC = 0.0162 SQ. MI.      CN=77                 *
   31         KM  * TIME OF CONCENTRATION = 14.6  MIN = 0.24 HR x 0.6 (SCS LAG) = 0.146 *
   32         KM  ************************************************************************
   33         KM
   34         BA  0.0162
   35         PB       1
   36         IN       6
   37         PC       0   0.001   0.002   0.003   0.004   0.005   0.006   0.007   0.008   0.009
   38         PC   0.010   0.011   0.012   0.013   0.014   0.015   0.016   0.017   0.018   0.019
   39         PC   0.020   0.021   0.022   0.023   0.024   0.026   0.027   0.028   0.029   0.030
   40         PC  0.0305   0.031   0.032   0.034   0.035   0.036   0.037   0.038   0.040   0.041
   41         PC   0.042   0.043   0.045   0.046   0.047   0.049   0.050   0.051   0.053   0.054
   42         PC   0.055   0.057   0.058   0.060   0.061   0.063   0.064   0.066   0.067   0.069
   43         PC   0.070   0.072   0.074   0.075   0.077   0.079   0.080   0.082   0.084   0.085
   44         PC   0.087   0.089   0.091   0.093   0.095   0.097   0.100   0.103   0.106   0.109
   45         PC   0.112   0.115   0.118   0.121   0.124   0.127   0.130   0.134   0.137   0.140
   46         PC   0.144   0.148   0.151   0.155   0.159   0.163   0.167   0.171   0.176   0.180
   47         PC   0.185   0.189   0.194   0.199   0.205   0.210   0.216   0.222   0.228   0.235
   48         PC   0.242   0.250   0.258   0.266   0.276   0.287   0.298   0.312   0.328   0.363
   49         PC   0.416   0.500   0.584   0.638   0.673   0.689   0.702   0.714   0.725   0.734
   50         PC   0.743   0.751   0.758   0.766   0.772   0.779   0.785   0.790   0.796   0.801
   51         PC   0.806   0.811   0.816   0.821   0.825   0.829   0.834   0.838   0.842   0.845
   52         PC   0.849   0.853   0.857   0.860   0.864   0.867   0.870   0.874   0.877   0.880
   53         PC   0.886   0.889   0.892   0.895   0.898   0.900   0.903   0.906   0.908   0.910
```

```
          LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

            54          PC   0.911   0.913   0.915   0.917   0.919   0.920   0.922   0.924   0.925   0.927
            55          PC   0.929   0.930   0.932   0.933   0.935   0.936   0.938   0.939   0.941   0.942
            56          PC   0.944   0.945   0.946   0.948   0.949   0.951   0.952   0.953   0.955   0.956
            57          PC   0.957   0.958   0.960   0.961   0.962   0.963   0.965   0.966   0.967   0.968
            58          PC   0.969   0.971   0.972   0.973   0.974   0.975   0.976   0.977   0.978   0.979
            59          PC   0.981   0.982   0.983   0.984   0.985   0.986   0.987   0.988   0.989   0.990
            60          PC   0.991   0.992   0.993   0.994   0.995   0.996   0.997   0.998   0.999   1.000
            61          LS      1      77
            62          UD  0.146

            63          KK   ROUTEROUTING IN WET POND PRIOR TO DISCHARGE OFFSITE
            64          KM
            65          KM  OUTLET STRUCTURE DATA:
            66          KM  ************************************************************
            67          KM  *  SPILLWAY WEIR LENGTH = 3' AT EL.: 494.1                 *
            68          KM  *  PROP. 1.8 " ORIFICE AT EL.: 491.0                       *
            69          KM  *  PROP. 3.9 " ORIFICE AT EL.: 492.8                       *
            70          KM  *  PROP. 8 " ORIFICE AT EL.: 493.3                        *
            71          KM  ************************************************************
            72          KM
            73          RS      1    ELEV     491
            74          SA  0.0115  0.1824  0.2309  0.2816  0.3278
            75          SE     491     492     494     496   496.5
            76          SQ       0    0.11     0.2    0.46    1.21     1.6    2.18   13.31   16.43   36.33
            77          SE     491   492.8     493   493.6   493.8     494   494.2   495.2   495.4   496.4

            78          KK  SITE-2DEV SITE-2 RUNOFF TOWARD PT.1
            79          KM
            80          KM  ***************************************************************************
            81          KM  * DRAINAGE AREA = 1.56 AC = 0.0024 SQ. MI.      CN=81                  *
            82          KM  * TIME OF CONCENTRATION = 13.6 MIN = 0.23 HR x 0.6 (SCS LAG) = 0.136  *
            83          KM  ***************************************************************************
            84          KM
            85          BA  0.0024
            86          LS      1      81
            87          UD   0.136

            88          KK    PT.1COMBINE ROUTE AND SITE-2 HYDROGRAPHS
            89          HC       2
            90          ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

    27      SITE-1
                V
                V
    63       ROUTE
                .
                .
    78          .       SITE-2
                .          .
                .          .
    88        PT.1.............
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

1

```
*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             MAY  1991                 *
*          VERSION 4.0.1U               *
*     Lahey F77L-EM/32 version 5.01     *
*       Dodson & Associates, Inc.       *
*  RUN DATE  06/07/12  TIME  12:58:17   *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
*****************************************
```

----------input file:dev-wq.ih1----------

HYDROLOGY FOR: CHESTER HILLS #5152-9
TOWN OF CHESTER, NY
DATE: 6/7/12 -SMS

ANALYSIS PREPARED BY: SPARACO ENGINEERING AND LAND SURVEYING, P.C.

ANALYSIS PARAMETERS:
DEVELOPED CONDITIONS RUN
STORM RECURRENCE INTERVALS = 1, 2, 5, 10, 25 & 100 YEAR
HYDROGRAPH METHOD: SCS
RAINFALL DISTRIBUTION: SCS TYPE III

24 HOUR RAINFALL DATA:
1 YEAR: 2.9 INCHES
2 YEAR: 3.5 INCHES
5 YEAR: 4.5 INCHES

```
                              10 YEAR: 5.5 INCHES
                              25 YEAR: 6.5 INCHES
                              100 YEAR: 8.0 INCHES


  25 IO          OUTPUT CONTROL VARIABLES
                      IPRNT          3  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

     IT          HYDROGRAPH TIME DATA
                       NMIN          6  MINUTES IN COMPUTATION INTERVAL
                      IDATE     1    0  STARTING DATE
                      ITIME       0000  STARTING TIME
                         NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE     2    0  ENDING DATE
                     NDTIME       0554  ENDING TIME
                      ICENT         19  CENTURY MARK

                 COMPUTATION INTERVAL     0.10 HOURS
                      TOTAL TIME BASE    29.90 HOURS

        ENGLISH UNITS
             DRAINAGE AREA          SQUARE MILES
             PRECIPITATION DEPTH    INCHES
             LENGTH, ELEVATION      FEET
             FLOW                   CUBIC FEET PER SECOND
             STORAGE VOLUME         ACRE-FEET
             SURFACE AREA           ACRES
             TEMPERATURE            DEGREES FAHRENHEIT

     JP          MULTI-PLAN OPTION
                      NPLAN          1  NUMBER OF PLANS

     JR          MULTI-RATIO OPTION
                     RATIOS OF PRECIPITATION
                   2.90      3.50      4.50      5.50      6.50      8.00


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           *************
           *           *
  27 KK    *   SITE-1  *     DEV. SITE RUNOFF TOWARD PT.1
           *           *
           *************

                    ******************************************************************
                    * DRAINAGE AREA = 10.36 AC = 0.0162 SQ. MI.       CN=77              *
                    * TIME OF CONCENTRATION = 14.6  MIN = 0.24 HR x 0.6 (SCS LAG) = 0.146 *
                    ******************************************************************


  36 IN          TIME DATA FOR INPUT TIME SERIES
                      JXMIN          6  TIME INTERVAL IN MINUTES
                     JXDATE     1    0  STARTING DATE
                     JXTIME          0  STARTING TIME

               SUBBASIN RUNOFF DATA

  34 BA          SUBBASIN CHARACTERISTICS
                      TAREA       0.02  SUBBASIN AREA

                 PRECIPITATION DATA

  35 PB               STORM       1.00  BASIN TOTAL PRECIPITATION

  37 PI            INCREMENTAL PRECIPITATION PATTERN
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.01      0.00      0.01      0.00      0.01      0.01      0.01      0.01      0.01
                  0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.02      0.03      0.05
                  0.08      0.08      0.05      0.03      0.02      0.01      0.01      0.01      0.01      0.01
                  0.01      0.01      0.01      0.01      0.01      0.01      0.00      0.01      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.01
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
```

```
   61 LS            SCS LOSS RATE
                       STRTL          1.00  INITIAL ABSTRACTION
                       CRVNBR        77.00  CURVE NUMBER
                       RTIMP          0.00  PERCENT IMPERVIOUS AREA

   62 UD            SCS DIMENSIONLESS UNITGRAPH
                       TLAG           0.15  LAG

                                                              ***

                                                          UNIT HYDROGRAPH
                                                      9 END-OF-PERIOD ORDINATES
               20.        40.        26.        11.        5.        2.        1.         0.         0.

      TOTAL RAINFALL =    1.00, TOTAL LOSS =    1.00, TOTAL EXCESS =    0.00

    PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                       6-HR       24-HR       72-HR     29.90-HR
 +   (CFS)        (HR)
                           (CFS)
 +        0.      0.10                   0.          0.          0.          0.
                          (INCHES)    0.000       0.000       0.000       0.000
                          (AC-FT)        0.          0.          0.          0.

                          CUMULATIVE AREA =     0.02 SQ MI

        ***            ***            ***            ***            ***

                          HYDROGRAPH AT STATION   SITE-1
                            FOR PLAN 1, RATIO = 2.90

      TOTAL RAINFALL =    2.90, TOTAL LOSS =    2.16, TOTAL EXCESS =    0.74

    PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                       6-HR       24-HR       72-HR     29.90-HR
 +   (CFS)        (HR)
                           (CFS)
 +        6.     12.40                   1.          0.          0.          0.
                          (INCHES)    0.605       0.739       0.739       0.739
                          (AC-FT)        1.          1.          1.          1.

                          CUMULATIVE AREA =     0.02 SQ MI

        ***            ***            ***            ***            ***

                          HYDROGRAPH AT STATION   SITE-1
                            FOR PLAN 1, RATIO = 3.50

      TOTAL RAINFALL =    3.50, TOTAL LOSS =    2.36, TOTAL EXCESS =    1.14

    PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                       6-HR       24-HR       72-HR     29.90-HR
 +   (CFS)        (HR)
                           (CFS)
 +        9.     12.30                   2.          0.          0.          0.
                          (INCHES)    0.950       1.139       1.139       1.139
                          (AC-FT)        1.          1.          1.          1.

                          CUMULATIVE AREA =     0.02 SQ MI

        ***            ***            ***            ***            ***

                          HYDROGRAPH AT STATION   SITE-1
                            FOR PLAN 1, RATIO = 4.50

      TOTAL RAINFALL =    4.50, TOTAL LOSS =    2.61, TOTAL EXCESS =    1.89

    PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                       6-HR       24-HR       72-HR     29.90-HR
 +   (CFS)        (HR)
                           (CFS)
 +       17.     12.30                   3.          1.          1.          1.
                          (INCHES)    1.585       1.888       1.888       1.888
                          (AC-FT)        1.          2.          2.          2.

                          CUMULATIVE AREA =     0.02 SQ MI

        ***            ***            ***            ***            ***

                          HYDROGRAPH AT STATION   SITE-1
                            FOR PLAN 1, RATIO = 5.50

      TOTAL RAINFALL =    5.50, TOTAL LOSS =    2.80, TOTAL EXCESS =    2.70

    PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                       6-HR       24-HR       72-HR     29.90-HR
 +   (CFS)        (HR)
                           (CFS)
 +       24.     12.30                   4.          1.          1.          1.
                          (INCHES)    2.265       2.705       2.705       2.705
```

```
                    (AC-FT)        2.          2.          2.          2.

                    CUMULATIVE AREA =     0.02 SQ MI

      ***           ***           ***         ***         ***

                     HYDROGRAPH AT STATION   SITE-1
                       FOR PLAN 1, RATIO = 6.50

    TOTAL RAINFALL =    6.50, TOTAL LOSS =    2.94, TOTAL EXCESS =    3.56

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                  6-HR        24-HR       72-HR      29.90-HR
+   (CFS)       (HR)
                   (CFS)
+      32.     12.30                5.          2.          1.          1.
                (INCHES)        2.976       3.564       3.564       3.564
                (AC-FT)           3.          3.          3.          3.

                    CUMULATIVE AREA =     0.02 SQ MI

      ***           ***           ***         ***         ***

                     HYDROGRAPH AT STATION   SITE-1
                       FOR PLAN 1, RATIO = 8.00

    TOTAL RAINFALL =    8.00, TOTAL LOSS =    3.09, TOTAL EXCESS =    4.91

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                  6-HR        24-HR       72-HR      29.90-HR
+   (CFS)       (HR)
                   (CFS)
+      44.     12.30                7.          2.          2.          2.
                (INCHES)        4.063       4.906       4.906       4.906
                (AC-FT)           4.          4.          4.          4.

                    CUMULATIVE AREA =     0.02 SQ MI


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


            **************
            *            *
  63 KK     *     ROUTE  *     ROUTING IN WET POND PRIOR TO DISCHARGE OFFSITE
            *            *
            **************

                    OUTLET STRUCTURE DATA:
                    ****************************************************************
                    *  SPILLWAY WEIR LENGTH = 3' AT EL.: 494.1                     *
                    *  PROP. 1.8 " ORIFICE AT EL.: 491.0                           *
                    *  PROP. 3.9 " ORIFICE AT EL.: 492.8                           *
                    *  PROP. 8 " ORIFICE AT EL.: 493.3                             *
                    ****************************************************************


               HYDROGRAPH ROUTING DATA

  73 RS          STORAGE ROUTING
                      NSTPS           1  NUMBER OF SUBREACHES
                       ITYP        ELEV  TYPE OF INITIAL CONDITION
                      RSVRIC     491.00  INITIAL CONDITION
                          X       0.00 WORKING R AND D COEFFICIENT

  74 SA               AREA          0.0         0.2         0.2         0.3         0.3

  75 SE           ELEVATION      491.00      492.00      494.00      496.00      496.50

  76 SQ           DISCHARGE          0.          0.          0.          0.          1.          2.          2.         13.         16.         36.

  77 SE           ELEVATION      491.00      492.80      493.00      493.60      493.80      494.00      494.20      495.20      495.40      496.40

                                                  ***

                                          COMPUTED STORAGE-ELEVATION DATA

                STORAGE        0.00        0.08        0.49        1.00        1.16
              ELEVATION      491.00      492.00      494.00      496.00      496.50

                                      COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

                STORAGE        0.00        0.08        0.23        0.27        0.40        0.45        0.49        0.54        0.79        0.84
                OUTFLOW        0.00        0.06        0.11        0.20        0.46        1.21        1.60        2.18       13.31       16.43
              ELEVATION      491.00      492.00      492.80      493.00      493.60      493.80      494.00      494.20      495.20      495.40

                STORAGE        1.00        1.12        1.16
                OUTFLOW       28.37       36.33       38.32
              ELEVATION      496.00      496.40      496.50
```

*** *** *** *** ***

HYDROGRAPH AT STATION ROUTE
FOR PLAN 1, RATIO = 2.90

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)					
		(CFS)				
+ 0.	16.80		0.	0.	0.	0.
		(INCHES)	0.222	0.473	0.473	0.473
		(AC-FT)	0.	0.	0.	0.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	29.90-HR
+ (AC-FT)	(HR)				
0.	16.80	0.	0.	0.	0.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	29.90-HR
+ (FEET)	(HR)				
493.50	16.90	493.43	492.60	492.28	492.28

CUMULATIVE AREA = 0.02 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION ROUTE
FOR PLAN 1, RATIO = 3.50

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)					
		(CFS)				
+ 1.	13.80		1.	0.	0.	0.
		(INCHES)	0.512	0.859	0.859	0.859
		(AC-FT)	0.	1.	1.	1.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	29.90-HR
+ (AC-FT)	(HR)				
0.	13.70	0.	0.	0.	0.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	29.90-HR
+ (FEET)	(HR)				
493.84	13.80	493.72	492.78	492.43	492.43

CUMULATIVE AREA = 0.02 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION ROUTE
FOR PLAN 1, RATIO = 4.50

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)					
		(CFS)				
+ 6.	12.70		2.	1.	1.	1.
		(INCHES)	1.156	1.592	1.592	1.592
		(AC-FT)	1.	1.	1.	1.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	29.90-HR
+ (AC-FT)	(HR)				
1.	12.70	0.	0.	0.	0.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	29.90-HR
+ (FEET)	(HR)				
494.52	12.70	494.02	492.94	492.55	492.55

CUMULATIVE AREA = 0.02 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION ROUTE
FOR PLAN 1, RATIO = 5.50

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)					
		(CFS)				
+ 13.	12.60		3.	1.	1.	1.
		(INCHES)	1.863	2.402	2.402	2.402
		(AC-FT)	2.	2.	2.	2.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	29.90-HR
+ (AC-FT)	(HR)				

```
        1.     12.60                    1.          0.          0.          0.

  PEAK STAGE     TIME                          MAXIMUM AVERAGE STAGE
                                        6-HR        24-HR       72-HR     29.90-HR
+   (FEET)       (HR)
     495.18     12.60                494.21      493.04      492.64      492.64

                          CUMULATIVE AREA =     0.02 SQ MI

       ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION     ROUTE
                          FOR PLAN 1, RATIO = 6.50

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR        24-HR       72-HR     29.90-HR
+   (CFS)        (HR)
                                (CFS)
+       22.     12.50                    5.          1.          1.          1.
                              (INCHES)   2.601       3.259       3.259       3.259
                              (AC-FT)    2.          3.          3.          3.

 PEAK STORAGE    TIME                        MAXIMUM AVERAGE STORAGE
                                        6-HR        24-HR       72-HR     29.90-HR
+  (AC-FT)       (HR)
         1.     12.50                    1.          0.          0.          0.

  PEAK STAGE     TIME                          MAXIMUM AVERAGE STAGE
                                        6-HR        24-HR       72-HR     29.90-HR
+   (FEET)       (HR)
     495.69     12.50                494.35      493.13      492.71      492.71

                          CUMULATIVE AREA =     0.02 SQ MI

       ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION     ROUTE
                          FOR PLAN 1, RATIO = 8.00

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR        24-HR       72-HR     29.90-HR
+   (CFS)        (HR)
                                (CFS)
+       34.     12.50                    7.          2.          2.          2.
                              (INCHES)   3.758       4.598       4.598       4.598
                              (AC-FT)    3.          4.          4.          4.

 PEAK STORAGE    TIME                        MAXIMUM AVERAGE STORAGE
                                        6-HR        24-HR       72-HR     29.90-HR
+  (AC-FT)       (HR)
         1.     12.50                    1.          0.          0.          0.

  PEAK STAGE     TIME                          MAXIMUM AVERAGE STAGE
                                        6-HR        24-HR       72-HR     29.90-HR
+   (FEET)       (HR)
     496.27     12.50                494.52      493.27      492.82      492.82

                          CUMULATIVE AREA =     0.02 SQ MI


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


            **************
            *            *
  78 KK     *    SITE-2  *     DEV SITE-2 RUNOFF TOWARD PT.1
            *            *
            **************

                        ************************************************************************
                        * DRAINAGE AREA = 1.56 AC = 0.0024 SQ. MI.      CN=81                  *
                        * TIME OF CONCENTRATION = 13.6 MIN = 0.23 HR x 0.6 (SCS LAG) = 0.136   *
                        ************************************************************************


               SUBBASIN RUNOFF DATA

  85 BA          SUBBASIN CHARACTERISTICS
                      TAREA        0.00  SUBBASIN AREA

               PRECIPITATION DATA

  35 PB               STORM        1.00  BASIN TOTAL PRECIPITATION

  37 PI            INCREMENTAL PRECIPITATION PATTERN
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
```

```
 0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00
 0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00
 0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00
 0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00
 0.00  0.01  0.00  0.01  0.00  0.01  0.01  0.01  0.01  0.01
 0.01  0.01  0.01  0.01  0.01  0.01  0.01  0.02  0.03  0.05
 0.08  0.08  0.05  0.03  0.02  0.01  0.01  0.01  0.01  0.01
 0.01  0.01  0.01  0.01  0.01  0.01  0.00  0.01  0.00  0.00
 0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00
 0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.01
 0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00
 0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00
 0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00
 0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00
 0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00
 0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00
 0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00
 0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00  0.00

86 LS          SCS LOSS RATE
                    STRTL        1.00  INITIAL ABSTRACTION
                   CRVNBR       81.00  CURVE NUMBER
                    RTIMP        0.00  PERCENT IMPERVIOUS AREA

87 UD          SCS DIMENSIONLESS UNITGRAPH
                    TLAG        0.14  LAG

                                                  ***

                                                  UNIT HYDROGRAPH
                                                9 END-OF-PERIOD ORDINATES
                  3.       6.       3.       1.       1.       0.       0.       0.       0.

     TOTAL RAINFALL =    1.00, TOTAL LOSS =    1.00, TOTAL EXCESS =    0.00

   PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR        72-HR     29.90-HR
+    (CFS)        (HR)
                    (CFS)
+       0.      0.10                    0.           0.           0.           0.
                (INCHES)          0.000        0.000        0.000        0.000
                (AC-FT)             0.           0.           0.           0.

                CUMULATIVE AREA =    0.00 SQ MI


       ***             ***             ***             ***             ***

                  HYDROGRAPH AT STATION   SITE-2
                    FOR PLAN 1, RATIO = 2.90

     TOTAL RAINFALL =    2.90, TOTAL LOSS =    2.05, TOTAL EXCESS =    0.85

   PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR        72-HR     29.90-HR
+    (CFS)        (HR)
                    (CFS)
+       1.      12.30                   0.           0.           0.           0.
                (INCHES)          0.701        0.850        0.850        0.850
                (AC-FT)             0.           0.           0.           0.

                CUMULATIVE AREA =    0.00 SQ MI


       ***             ***             ***             ***             ***

                  HYDROGRAPH AT STATION   SITE-2
                    FOR PLAN 1, RATIO = 3.50

     TOTAL RAINFALL =    3.50, TOTAL LOSS =    2.21, TOTAL EXCESS =    1.29

   PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR        72-HR     29.90-HR
+    (CFS)        (HR)
                    (CFS)
+       2.      12.30                   0.           0.           0.           0.
                (INCHES)          1.083        1.290        1.290        1.290
                (AC-FT)             0.           0.           0.           0.

                CUMULATIVE AREA =    0.00 SQ MI


       ***             ***             ***             ***             ***

                  HYDROGRAPH AT STATION   SITE-2
                    FOR PLAN 1, RATIO = 4.50

     TOTAL RAINFALL =    4.50, TOTAL LOSS =    2.40, TOTAL EXCESS =    2.10

   PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR        72-HR     29.90-HR
+    (CFS)        (HR)
                    (CFS)
+       3.      12.30                   0.           0.           0.           0.
                (INCHES)          1.769        2.096        2.096        2.096
```

```
                    (AC-FT)        0.          0.          0.          0.

                    CUMULATIVE AREA =     0.00 SQ MI

      ***           ***           ***           ***           ***

                    HYDROGRAPH AT STATION    SITE-2
                      FOR PLAN 1, RATIO = 5.50

     TOTAL RAINFALL =    5.50, TOTAL LOSS =    2.54, TOTAL EXCESS =    2.96

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR        72-HR     29.90-HR
+   (CFS)       (HR)
                     (CFS)
+       4.     12.30                  1.          0.          0.          0.
                   (INCHES)      2.490       2.958       2.958       2.958
                   (AC-FT)         0.          0.          0.          0.

                    CUMULATIVE AREA =     0.00 SQ MI

      ***           ***           ***           ***           ***

                    HYDROGRAPH AT STATION    SITE-2
                      FOR PLAN 1, RATIO = 6.50

     TOTAL RAINFALL =    6.50, TOTAL LOSS =    2.64, TOTAL EXCESS =    3.86

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR        72-HR     29.90-HR
+   (CFS)       (HR)
                     (CFS)
+       5.     12.30                  1.          0.          0.          0.
                   (INCHES)      3.230       3.856       3.856       3.856
                   (AC-FT)         0.          0.          0.          0.

                    CUMULATIVE AREA =     0.00 SQ MI

      ***           ***           ***           ***           ***

                    HYDROGRAPH AT STATION    SITE-2
                      FOR PLAN 1, RATIO = 8.00

     TOTAL RAINFALL =    8.00, TOTAL LOSS =    2.76, TOTAL EXCESS =    5.24

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR        72-HR     29.90-HR
+   (CFS)       (HR)
                     (CFS)
+       7.     12.30                  1.          0.          0.          0.
                   (INCHES)      4.347       5.243       5.243       5.243
                   (AC-FT)         1.          1.          1.          1.

                    CUMULATIVE AREA =     0.00 SQ MI


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


                ***************
                *             *
  88 KK         *      PT.1   *     COMBINE ROUTE AND SITE-2 HYDROGRAPHS
                *             *
                ***************

  89 HC              HYDROGRAPH COMBINATION
                          ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                                      ***

      ***           ***           ***           ***           ***

                    HYDROGRAPH AT STATION      PT.1
                      FOR PLAN 1, RATIO = 2.90

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR        72-HR     29.90-HR
+   (CFS)       (HR)
                     (CFS)
+       1.     12.40                  0.          0.          0.          0.
                   (INCHES)      0.245       0.522       0.522       0.522
                   (AC-FT)         0.          1.          1.          1.

                    CUMULATIVE AREA =     0.02 SQ MI

      ***           ***           ***           ***           ***

                    HYDROGRAPH AT STATION      PT.1
                      FOR PLAN 1, RATIO = 3.50
```

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)					
		(CFS)				
+ 2.	12.30		1.	0.	0.	0.
		(INCHES)	0.566	0.914	0.914	0.914
		(AC-FT)	1.	1.	1.	1.

CUMULATIVE AREA = 0.02 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION PT.1
FOR PLAN 1, RATIO = 4.50

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)					
		(CFS)				
+ 7.	12.70		2.	1.	1.	1.
		(INCHES)	1.212	1.657	1.657	1.657
		(AC-FT)	1.	2.	2.	2.

CUMULATIVE AREA = 0.02 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION PT.1
FOR PLAN 1, RATIO = 5.50

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)					
		(CFS)				
+ 15.	12.50		4.	1.	1.	1.
		(INCHES)	1.911	2.473	2.473	2.473
		(AC-FT)	2.	2.	2.	2.

CUMULATIVE AREA = 0.02 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION PT.1
FOR PLAN 1, RATIO = 6.50

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)					
		(CFS)				
+ 26.	12.50		5.	2.	1.	1.
		(INCHES)	2.644	3.336	3.336	3.336
		(AC-FT)	3.	3.	3.	3.

CUMULATIVE AREA = 0.02 SQ MI

*** *** *** *** ***

HYDROGRAPH AT STATION PT.1
FOR PLAN 1, RATIO = 8.00

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)					
		(CFS)				
+ 40.	12.40		8.	2.	2.	2.
		(INCHES)	3.795	4.681	4.681	4.681
		(AC-FT)	4.	5.	5.	5.

CUMULATIVE AREA = 0.02 SQ MI

1

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
VOLUME IN ACRE-FEET, TIME TO PEAK IN HOURS

					RATIOS APPLIED TO PRECIPITATION					
OPERATION	STATION	AREA	PLAN		RATIO 1	RATIO 2	RATIO 3	RATIO 4	RATIO 5	RATIO 6
					2.90	3.50	4.50	5.50	6.50	8.00
HYDROGRAPH AT										
+	SITE-1	0.016	1	FLOW	5.54	9.40	16.76	24.48	32.38	44.34
				TIME	12.40	12.30	12.30	12.30	12.30	12.30
				VOLUME	0.64	0.98	1.63	2.34	3.08	4.24
ROUTED TO										
+	ROUTE	0.016	1	FLOW	0.42	1.28	5.79	13.07	22.30	33.82
				TIME	16.80	13.80	12.70	12.60	12.50	12.50
				VOLUME	0.41	0.74	1.38	2.07	2.82	3.97

			** PEAK STAGES IN FEET **							
			1	STAGE	493.50	493.84	494.52	495.18	495.69	496.27
				TIME	16.90	13.80	12.70	12.60	12.50	12.50
HYDROGRAPH AT										
+	SITE-2	0.002	1	FLOW	0.98	1.67	2.87	4.09	5.30	7.11
				TIME	12.30	12.30	12.30	12.30	12.30	12.30
				VOLUME	0.11	0.17	0.27	0.38	0.49	0.67
2 COMBINED AT										
+	PT.1	0.019	1	FLOW	1.04	1.75	6.70	15.22	25.62	39.68
				TIME	12.40	12.30	12.70	12.50	12.50	12.40
				VOLUME	0.52	0.91	1.64	2.45	3.31	4.64

*** NORMAL END OF HEC-1 ***

KEVIN L. PATTON, P.E.

OFFICE LOCATED AT
ADVANCE TESTING COMPANY, INC.
3348 ROUTE 208
CAMPBELL HALL, NY 10916
Phone (845) 496-1600 Fax (845) 496-1398

CLIENT:	Orange County Trucking PO Box 1351 Greenwood Lake, NY 10925	PROJECT:	Chester Hill Holdings Chester, NY
ATTN.:	Mr. Frank Lotito	PROJECT NO.: DATE:	060720 May 1, 2012

Re: Sizing of Stormwater Detention Basin

The following information was used to design the stormwater detention basin at the project site.

The ultimate contributory area for stormwater flowing to the detention pond consists of the entire mine area (32.23 acres) plus 0.40 acres outside the mine, at the top of the hill near the south end of the east side of the proposed quarry area, for 32.63 acres total.

The table below lists the estimated total 24-hour rainfall for storms ranging from a one-year to a 100-year storm. Information is the NRCS Storm Data for Orange County, NY, and typically has a Type III rainfall distribution.

Rainfall Return Period (years)	24-hour Rainfall Amount (inches)
1	2.9
2	3.5
5	4.5
10	5.5
25	6.5
50	7.0
100	8.0

Total runoff is calculated using the following equation:

$$Q = (P - Ia)^2 / [(P - Ia) + S]$$

Where Q= runoff, P = rainfall, S = storage (maximum retention after runoff begins) and Ia = initial abstraction (retention before runoff begins.) All values are in inches.

The soils at the site are all hydrologic group C types, with a composite runoff curve number (CN) of 74. Values S and Ia are calculated as follows:

$$S = [(1000/CN) - 10] = 3.5$$
$$Ia = 0.2S = 0.7$$

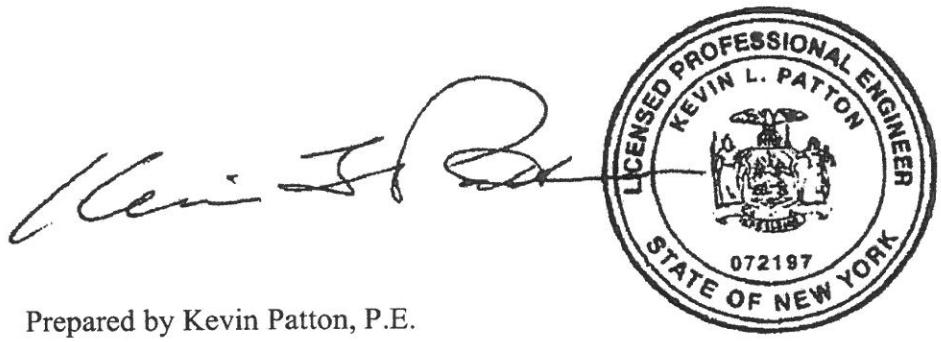
Runoff for the 100 year storm under existing conditions is calculated as:

$$Q = (8.0 - 0.7)^2 / [(8.0 - 0.7) + 3.5] = 4.93 \text{ inches.}$$

Total runoff =
32.63 acres x 43560 sq ft per acre x 4.93 inches / 12 inches per foot
= 583,940 cubic feet.

Under developed conditions, the mined areas, processing area, etc. have hydrologic characteristics similar to a gravel pavement over hydrologic group D soils, with a CN of 91, and the overall CN for the site is 90. Using this value, S = 1.1 and Ia = 0.2. The developed runoff value Q is 5.35 inches, and the total runoff volume for the site is 633,620 cubic feet.

The detention basin has a maximum storage volume of 862,290 cubic feet, based on a depth of 13 feet from the spillway to the top of the forebays and micropool (elevations 498 to 485 feet) with an area at the 485ft elevation of 48600 sq ft and an area of 84060 sq ft at 498ft elevation. The basin thus has adequate volume to detain the runoff from the 100 year storm.



Prepared by Kevin Patton, P.E.

EROSION CONTROL NOTES:

1. TEMPORARY SEDIMENTATION ENTRAPMENT AREAS SHALL BE PROVIDED AT KEY LOCATIONS TO INTERCEPT AND CLARIFY SILT LADEN RUNOFF FROM THE SITE. THESE MAY BE EXCAVATED OR MAY BE CREATED UTILIZING EARTHEN BERMS, RIP-RAP OR CRUSHED STONE DAMS, HAY BALES OR OTHER SUITABLE MATERIALS. DIVERSION SWALES, BERMS OR OTHER CHANNELIZATION SHALL BE CONSTRUCTED TO INSURE THAT ALL SILT LADEN WATERS ARE DIRECTED INTO THE ENTRAPMENT AREAS, WHICH SHALL NOT BE PERMITTED TO BE FILLED IN, BUT SHALL BE CLEANED PERIODICALLY DURING THE COURSE OF CONSTRUCTION. THE COLLECTED SILT SHALL BE DEPOSITED IN AREAS SAFE FROM FURTHER EROSION.

2. ALL DISTURBED AREAS, EXCEPT ROADWAYS, WHICH WILL REMAIN UNFINISHED FOR MORE THAN THIRTY (30) DAYS, SHALL BE TEMPORARILY SEEDED WITH 1/2 LB. OF RYE-GRASS OR MULCHED WITH 100 LBS. OF STRAW OR HAY PER 1000 SQUARE FEET. ROADWAYS SHALL BE STABILIZED AS RAPIDLY AS PRACTICABLE BY INSTALLATION OF THE BASE COURSE.

3. SILT THAT LEAVES THE SITE IN SPITE OF THE REQUIRED PRECAUTIONS SHALL BE COLLECTED AND REMOVED AS DIRECTED BY APPROPRIATE MUNICIPAL AUTHORITIES.

4. AT THE COMPLETION OF THE PROJECT, ALL TEMPORARY SILTATION DEVICES SHALL BE REMOVED AND THE AFFECTED AREAS REGRADED, REPLANTED OR TREATED IN ACCORDANCE WITH THE APPROVED SITE PLANS.

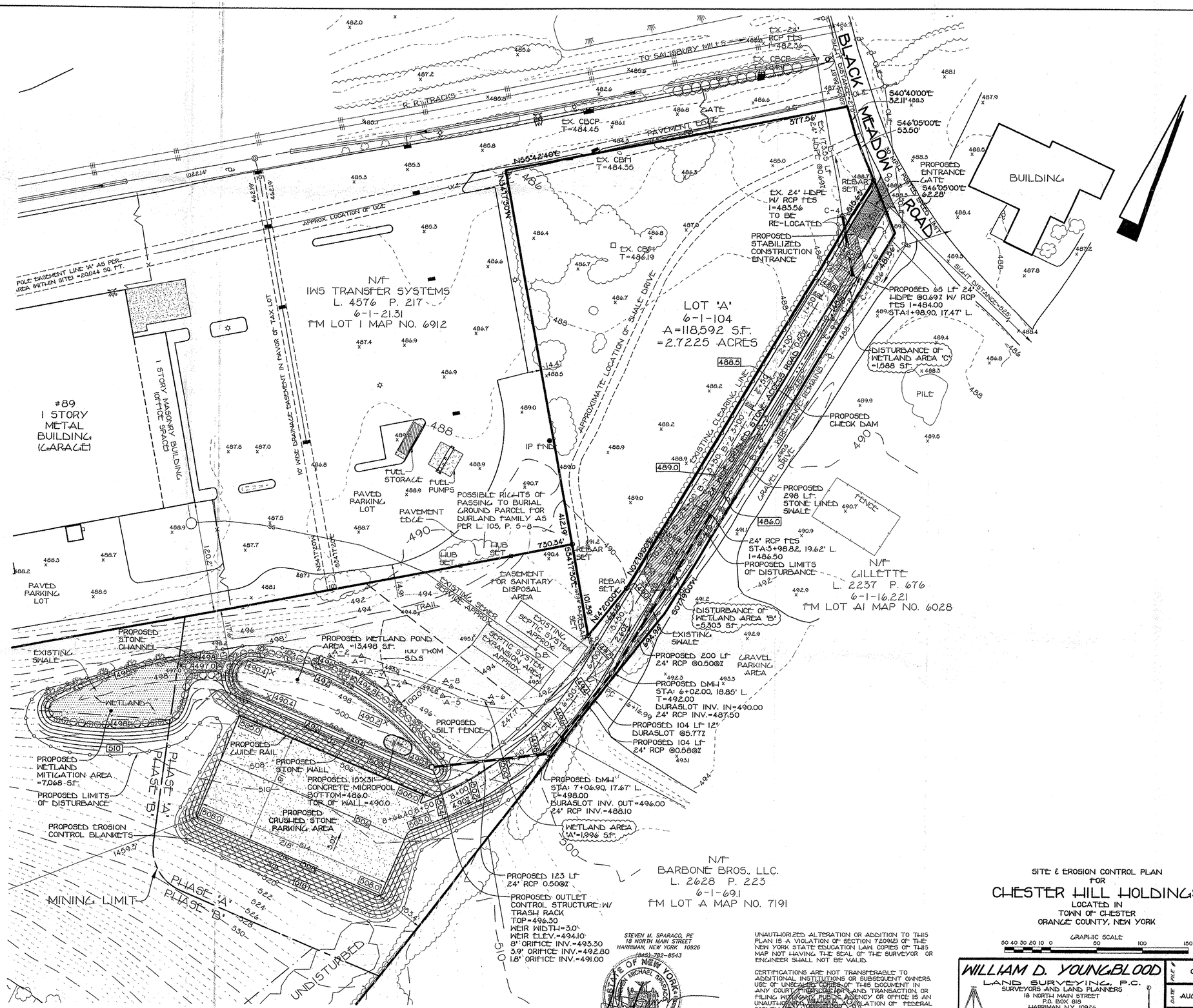
5. THE SEED MIXTURE FOR PERMANENT SEEDLINGS SHALL BE:
   KENTUCKY BLUEGRASS - 40 LBS./AC. (.92 #/1000 SF)
   CREEPING RED FESCUE - 140 LBS./AC. (3.21 #/1000 SF)
   PERENNIAL RYEGRASS - 50 LBS./ACRE (1.15 #/1000 SF)

6. THE FOLLOWING APPLICATION RATES ARE TO BE USED FOR PERMANENT SEEDLING:
   LIME IS TO BE APPLIED TO ATTAIN A PH OF AT LEAST 5.5 TO 6.0, OR AT A RATE OF 2 TONS/ACRES.
   FERTILIZER IS TO BE APPLIED AT A RATE OF 600 LBS. PER ACRE OR EITHER 5-10-10 OR 10-10-10.

7. SOD CAN BE USED INSTEAD OF SEED.

8. CONSTRUCTION SEQUENCE FOR EROSION CONTROL:
   A. CONSTRUCT STABILIZED CONSTRUCTION ENTRANCE.
   B. INSTALL SEDIMENT BARRIERS AS PER NOTE #1 ABOVE.
   C. CLEAR EXISTING TREES AND VEGETATION FROM AREAS TO BE EXCAVATED OR FILLED, STRIP AND STOCKPILE TOPSOIL FROM ALL AREAS TO BE DISTURBED.
   D. PERFORM NECESSARY EXCAVATION OR FILL OPERATIONS TO BRING SITE TO DESIRED SUBGRADE. INSTALL STORM DRAINAGE SYSTEM.
   E. INSTALL SEDIMENT BARRIERS AROUND ALL STORM DRAIN INLETS.
   F. SEED ALL DISTURBED AREAS WHICH WILL REMAIN UNDISTURBED FOR A PERIOD OF 30 DAYS AS PER NOTE #2 ABOVE.
   G. AFTER COMPLETION OF THE SITE CONSTRUCTION, FINE GRADE AND SPREAD TOPSOIL ON ALL LAWN AREAS AND SEED AS PER NOTES #5 AND #6 ABOVE.
   H. REMOVE SEDIMENT BARRIERS AS PER NOTE #4 ABOVE.
   I. MAINTAIN ALL SEEDED AND PLANTED AREAS TO INSURE A VIABLE STABILIZED VEGETATIVE COVER.

9. ALL CONSTRUCTION TO MEET CURRENT TOWN SPECS.



LEGEND

EXISTING	PROPOSED	ITEMS
		PROPERTY LINE
		WETLANDS
		EDGE OF CLEARING
OHE		OVERHEAD ELECTRIC
		UTILITY POLE
D		DRAINAGE PIPE
		LIMITS OF DISTURBANCE
+501.5	+501.5	SPOT GRADE
502	502	2' CONTOUR INTERVAL
500	500	10' CONTOUR INTERVAL
		SILT FENCE
		CRUSHED STONE DRIVEWAY
		EROSION CONTROL BLANKETS

THIS PLAN IS PART OF A SET OF A TOTAL OF 4 SHEETS. THESE PLANS SHALL NOT BE DEEMED AS VALID UNLESS ACCOMPANIED BY ALL SHEETS BELONGING TO THIS SET.

ALL UTILITIES ARE SHOWN IN AN APPROXIMATE WAY FROM AVAILABLE INFORMATION. THE CONTRACTOR SHALL CALL THE LOCAL UNDERGROUND FACILITIES PROTECTIVE ORGANIZATION TO HAVE ALL UNDERGROUND UTILITIES MARKED IN THE FIELD PRIOR TO ANY CLEARING OR ANY CONSTRUCTION. THE CONTRACTOR SHALL ALSO VERIFY THE LOCATION, SIZE AND INVERT OF ALL UTILITIES PRIOR TO ANY CONSTRUCTION. ANY UTILITY FOR WHICH NO EVIDENCE CAN BE SEEN ON THE SURFACE OF THE LANDS MAY NOT BE SHOWN ON THIS DRAWING.

16 NYCRR PART 753 REQUIRES 2 WORKING DAYS NOTICE PRIOR TO START OF ANY UNDERGROUND WORK
DIG SAFELY NEW YORK
NEWDIGSAFELY.NY.GOV
1-800-962-7962

REV. 10-17-11-PHASES, MINING
REV. 2-16-12-100 YR FLOOD PLAIN
REV. 6-8-12-PARKING AREA, WET POND

STEVEN M. SPARACO, PE
18 NORTH MAIN STREET
HARRIMAN, NEW YORK 10926
(845) 782-8543

STATE OF NEW YORK — STEVEN MICHAEL SPARACO — 070613 — LICENSED PROFESSIONAL ENGINEER

WILLIAM D. YOUNGBLOOD L.S. # 50466 ©

WILLIAM D. YOUNGBLOOD — 50466 — LICENSED LAND SURVEYOR

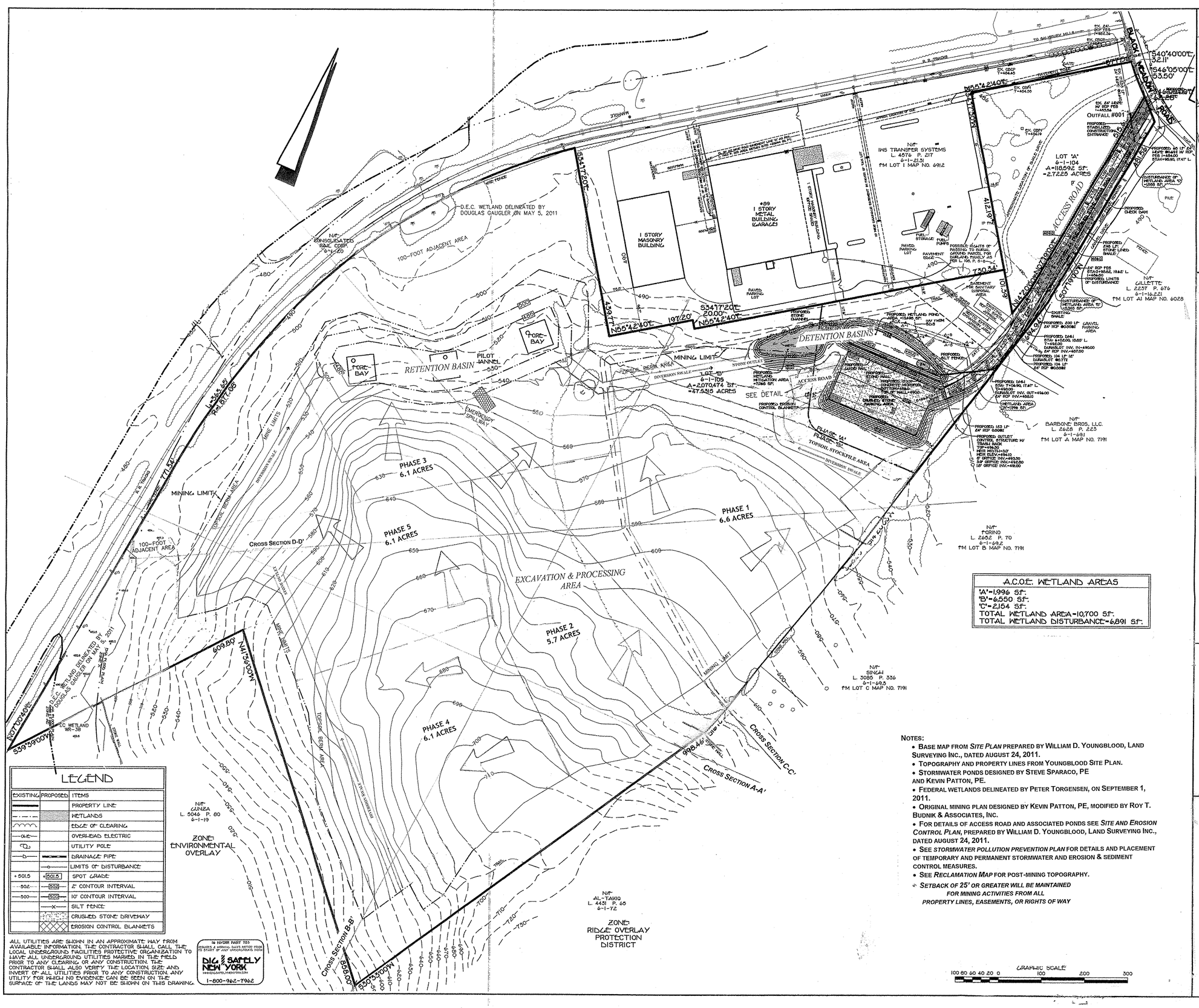
SITE & EROSION CONTROL PLAN
FOR
CHESTER HILL HOLDINGS
LOCATED IN
TOWN OF CHESTER
ORANGE COUNTY, NEW YORK

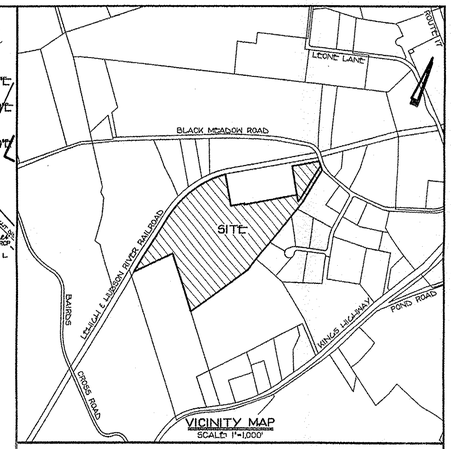
GRAPHIC SCALE
50 40 30 20 10 0 50 100 150

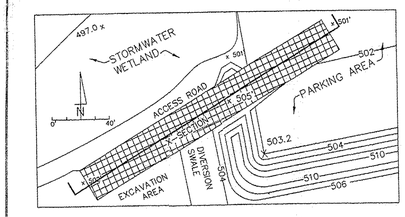
WILLIAM D. YOUNGBLOOD
LAND SURVEYING, P.C.
SURVEYORS AND LAND PLANNERS
18 NORTH MAIN STREET
P.O. BOX 818
HARRIMAN, N.Y. 10926
TEL: (845) 782-8549
FAX: (845) 782-5901
WDYLS1@GMAIL.COM

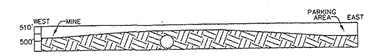
FILE #	0-3425
DATE	AUG. 24, 2011
SCALE	1"=50
DWG #	2 OF 4

0-3425









ACCESS ROAD DETAIL

Direction of Stormwater Flow

A.C.O.E. WETLAND AREAS
'A'=1,996 S.F.
'B'=6,550 S.F.
'C'=2,154 S.F.
TOTAL WETLAND AREA=10,700 S.F.
TOTAL WETLAND DISTURBANCE=6,891 S.F.

PROJECT ACREAGE SUMMARY
PROPERTY: 47 ACRES
LIFE OF MINE: 35 ACRES
PERMIT TERM: 11ACRES

Excavation and processing area: 30.6 acres
Detention pond and parking area: 2.4 acres
Access road: 2.0 acres

DATE:	JUNE 27, 2018	
REV:		

NOTES:
- BASE MAP FROM *SITE PLAN* PREPARED BY WILLIAM D. YOUNGBLOOD, LAND SURVEYING INC., DATED AUGUST 24, 2011.
- TOPOGRAPHY AND PROPERTY LINES FROM YOUNGBLOOD SITE PLAN.
- STORMWATER PONDS DESIGNED BY STEVE SPARACO, PE AND KEVIN PATTON, PE.
- FEDERAL WETLANDS DELINEATED BY PETER TORGENSEN, ON SEPTEMBER 1, 2011.
- ORIGINAL MINING PLAN DESIGNED BY KEVIN PATTON, PE, MODIFIED BY ROY T. BUDNIK & ASSOCIATES, INC.
- FOR DETAILS OF ACCESS ROAD AND ASSOCIATED PONDS SEE *SITE AND EROSION CONTROL PLAN*, PREPARED BY WILLIAM D. YOUNGBLOOD, LAND SURVEYING INC., DATED AUGUST 24, 2011.
- SEE *STORMWATER POLLUTION PREVENTION PLAN* FOR DETAILS AND PLACEMENT OF TEMPORARY AND PERMANENT STORMWATER AND EROSION & SEDIMENT CONTROL MEASURES.
- SEE *RECLAMATION MAP* FOR POST-MINING TOPOGRAPHY.
- *SETBACK OF 25' OR GREATER WILL BE MAINTAINED FOR MINING ACTIVITIES FROM ALL PROPERTY LINES, EASEMENTS, OR RIGHTS OF WAY*

STORMWATER MAP

CHESTER HILL HOLDING MINE
Black Meadow Road
Town of Chester
Orange County, NY

Roy T. Budnik & Associates, Inc. 317 Main Street Poughkeepsie, NY	Chester Hill Holding Company, Inc. PO Box 1351 Greenwood Lake, NY